51th - 51ième
Annual Meeting - Réunion Annuelle
2019
Québec City, Québec
Canada
September 19-21 Septembre
CAPS 2020 Annual Meeting
ACCP 2020 Réunion Annuelle

September 10-12 Septembre, 2020
Winnipeg, Manitoba
Canada

PLAN TO JOIN US!
Joignez-vous à nous!
CANADIAN ASSOCIATION of
PAEDIATRIC SURGEONS
ASSOCIATION CANADIENNE de
CHIRURGIE PÉDIATRIQUE

51st Annual Meeting
51 ième Réunion Annuelle
September 10-12 Septembre 2019
Le Concorde
Québec City, Québec
CANADA
This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada and approved by the Canadian Association of General Surgeons for which an attendee may claim up to **14.75 Section 1 credits** (1 hour = 1 Maincert credit) and **4 hours of Section 3 credits**. Participants should claim the number of hours consistent with their attendance.

In keeping with CMA Guidelines, program content and selection of speakers are the responsibility of the planning committee. Support is directed toward the costs of the course and not to individual speakers. All speakers have indicated no involvement with industry that may be perceived as potentially influencing the presentation of the educational material.
Educational Objectives

The Annual meeting of the Canadian Association of Paediatric Surgeons is intended to provide 3 days of comprehensive continuing education in the field of pediatric general and thoracic surgery. Specifically, the objectives are to:

- Present current updates on advances in clinical pediatric surgery
- Present current updates on advances in the pathophysiology of pediatric surgical disorders
- Provide for group discussion on controversial issues in pediatric general and thoracic surgery through:
  - Discussion of presented scientific papers
  - Interactive panel discussion on the management of clinical pediatric problems

Over the three days of the meeting, the breadth of pediatric general and thoracic surgery topics will be covered through presentation of original works by trainees, professional colleagues and allied health care workers involved in the field. The works will acquaint participants with the latest clinical and basic science research findings and trends influencing the clinical practice of pediatric surgery, as well as reacquaint participants with interesting pediatric surgical entities. Controversial topics will invite participatory discussion by the delegates.

A panel of 6 members of the CAPS Program Committee has chosen the abstracts presented, based on quality of abstracts submitted and reflecting what is commonly relevant to the practice of pediatric surgery. Input for subsequent meetings and how to improve this one will be solicited from the delegates at the conclusion of the meeting.
### Scientific and Social Programme
#### Programme Scientifique et Social

**2019 Meeting Room Schedule**

<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
<th>TIME</th>
<th>LOCATION</th>
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</thead>
<tbody>
<tr>
<td>Wednesday, Sept 18</td>
<td>Executive Meeting</td>
<td>07:30-11:45</td>
<td>Pilot</td>
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<td>Council Meeting</td>
<td>11:45-17:00</td>
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<td>CAPSNet Meeting</td>
<td>17:00-19:00</td>
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<td>Thursday, Sept 19</td>
<td>Publication Committee</td>
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<td>Trauma Meeting</td>
<td>10:30-12:00</td>
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<td>CaPSNIG Committee</td>
<td>08:00-14:30</td>
<td>Fortin Leduc</td>
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<td></td>
<td>Education Committee</td>
<td>07:30-10:00</td>
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<td>Registration</td>
<td>10:00-17:00</td>
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<td>Scientific Meeting Sessions</td>
<td>13:00-16:45</td>
<td>Krieghoff 1 &amp; Suzor-Côté</td>
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<td>Speaker Ready Room</td>
<td>08:00 – 17:00</td>
<td>Morrice</td>
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<td>Coffee Break</td>
<td>14:30-16:45</td>
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<td>15:45-16:45</td>
<td>Krieghoff 1 &amp; Suzor-Côté</td>
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<td>e-poster Session Track B</td>
<td>15:45-16:45</td>
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<td>Research Committee</td>
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<td>CBD Special Program</td>
<td>17:00-18:00</td>
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<td>17:00-18:00</td>
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<td>Welcome Reception/Buffet</td>
<td>18:30 – 23:00</td>
<td>Krieghoff 1 &amp; Suzor-Côté</td>
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<td>Friday, Sept 20</td>
<td>Advocacy &amp; Partnership</td>
<td>06:30 –08:00</td>
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<td>RCPSC Specialty Committee</td>
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<td>07:00 –16:00</td>
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<td></td>
<td>Speaker Ready Room</td>
<td>07:00 – 16:00</td>
<td>Morrice</td>
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<td>Scientific Meeting Sessions</td>
<td>08:00 –16:00</td>
<td>Krieghoff 1 &amp; Suzor-Côté</td>
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<td><strong>Exhibits &amp; Poster Viewing</strong></td>
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<td>All Breaks &amp; Lunch</td>
<td>07:00 – 17:00</td>
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<td>15:45-17:30</td>
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<td>Evening Free</td>
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<td>Annual Business Breakfast</td>
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<td>Annual Business Meeting</td>
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<td>09:00-16:30</td>
<td>Krieghoff 1 &amp; Suzor-Côté</td>
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<tr>
<td><strong>Exhibits &amp; Poster Viewing</strong></td>
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<td><strong>Foyer</strong></td>
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<td>All Breaks and Box Lunch</td>
<td>09:00 – 16:30</td>
<td>Foyer</td>
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<td>07:00-17:00</td>
<td>Morrice</td>
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<td>Presidential Reception &amp; Banquet</td>
<td>18:30 – 24:00</td>
<td>Krieghoff 1 &amp; Suzor-Côté</td>
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<td><strong>Sunday, Sept 22</strong></td>
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<td>07:30-11:30</td>
<td>Le Salon du Conseil- 4th Floor</td>
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</table>
15th Annual CaPSNIG Meeting, September 19, 2019
Le Concorde Hotel  Fortin - Leduc Room
Quebec City

0730-0745  Registration / Networking Breakfast / CaPSNIG Executive Update

Breakfast will be served

0745-0800  Introductions & Welcome
Hazel Pleasants-Terashita & Caroline Daost - Program Chairs, CaPSNIG
Christina Belza - CaPSNIG Chair
Presidential Welcome – Dr Leslie Scott; CAPS President

0810-0830  In & Out: Joining Forces to Improve Quality of Care in Babies with Gastroschisis
Nicole de Silva, The Hospital for Sick Children

0830-0850  The Case of Baby A
Sophie Fournier, Elissa Remmer, Geraldine Shaak & Nadine Vandal
Montreal Children’s Hospital

0850-0910  Clinical Research in Paediatric Surgery
Eveline Lapidus-Krol,  The Hospital for Sick Children

0910-0930  Trauma Code Blue Simulation Between Emergency and the OR
Erin Hempel & Marie-Eve Mercier,  The Hospital for Sick Children

0930-0950  Coffee Break & Networking

0950-1010  Managing Esophageal Atresia: Pre Operative Oral Secretions & Magnamosis -
The Winnipeg Experience
Cindy Holland, Children’s Hospital, HSC Winnipeg

1010-1030  “What Would You Do?”  An Interesting Surgical Case Study
Monping Chiang, The Hospital for Sick Children

1030-1200  National G-tube Strategy – follow up discussion
Julia Yole & Cindy Holland, McMaster Children’s Hospital & Children’s Hospital Winnipeg
and Joining Together: Round table Discussions

1200-1245  Lunch, Networking Discussions & Annual Group Photograph

1245-1330  Fellow Education Session
Dr Maeve Trudeau, Clinical Fellow, CHU Ste Justine

1330-1345  Closing Remarks & Evaluation
Christina Belza - CaPSNIG Chair

This meeting was made possible by a generous donation from CAPS. Please thank your surgeons!
Welcome to beautiful Quebec City and the 51st Annual Meeting of the Canadian Association of Paediatric Surgeons. After a wonderful meeting celebrating the 50th birthday of our association last year, we are excited about launching our next 50 years at this meeting. An excellent scientific program awaits us, and the social program will put the icing on the week.

Our JPS/MacLeod lecturer this year comes to us from Sheffield, England. Mr. Ross Fisher is a Consultant Paediatric Surgeon with a special interest in Trauma and Knowledge Translation /Presentation Skills. His lecture is also sponsored by the Harry S. Morton Lectureship Award from the Royal College of Physicians and Surgeons of Canada. We look forward to his involvement in our meeting.

The CAPS Ethics Session this year will focus on caring for Indigenous Children and we will be privileged to have Dr. Stanley Vollant as guest speaker, sharing his perspective as an Innu surgeon.

Quebec City, founded in 1608 and whose Old Quebec district was declared World Heritage Site by UNESCO in 1985, is a beautiful city with great food and lovely surrounding scenic vistas: a wonderful location for a fall meeting and worth spending an extra few days to explore if possible.

I would like to acknowledge and thank Priscilla Chiu, Program Committee Chair, Andrea Winthrop, Education Committee Chair, Pascale Prasil, our Local Arrangements Chair, and BJ Hancock, our tireless Secretary-Treasurer, for their significant commitment of time and talent to make this meeting a success. As always we are especially grateful to Arlene Ein, our meeting coordinator, who makes everything come together.

The CAPS Annual meeting offers academic and clinical enrichment. It is also where we can enjoy the camaraderie of our colleagues, renewing longstanding friendships and making new ones. Quebec City awaits: ENJOY!

Leslie Scott MD, FRCSC

President
Canadian Association of Paediatric Surgeons
MOT DE BIENVENUE DU PRÉSIDENT

Bienvenue dans la belle ville de Québec pour la 51\textsuperscript{ième} réunion annuelle de l’Association canadienne de chirurgie pédiatrique. Après la grande célébration du 50\textsuperscript{ième} anniversaire de notre association l’année dernière, nous amorçons avec enthousiasme les 50 prochaines années. Un excellent programme scientifique nous attend, et les activités sociales seront la cerise sur le gâteau.

Le conférencier JPS/MacLeod cette année nous vient de Sheffield en Angleterre. M. Ross Fisher est un chirurgien pédiatrique avec un intérêt particulier en traumatologie et en transfert de connaissances/habiletés de présentation. Sa présence sera aussi subventionnée grâce au prix de conférencier invité en chirurgie Harry S. Morton du Collège royal des médecins et chirurgiens du Canada. Nous nous réjouissions à l’avance de sa participation à notre réunion. La session sur l’éthique portera sur les soins aux enfants autochtones; nous aurons le privilège d’accueillir le Dr Stanley Volland en tant que conférencier, qui partagera sa perspective en tant que chirurgien Innu.

La Ville de Québec, fondée en 1608 et dont le Vieux-Québec a été déclaré Patrimoine Mondial par l’UNESCO en 1985, possède d’excellents restaurants et de superbes panoramas; un site merveilleux pour une réunion en septembre et une excellente occasion d’y passer quelques jours de plus à explorer.

Je tiens à remercier Priscilla Chiu, présidente du comité du programme scientifique, Andrea Winthrop, présidente du comité d’éducation, Pascale Prasil, en charge des arrangements locaux, et BJ Hancock, notre infatigable secrétaire-trésorière, pour leur importante contribution de temps et de talent afin de faire de cette réunion un succès. Comme toujours, nous sommes particulièrement reconnaissants envers Arlene Ein, notre coordonnatrice de congrès, qui fait que tout tombe en place.

La réunion annuelle de l’ACCP nous offre un enrichissement clinique et académique. On y profite aussi de la camaraderie de nos collègues, renouer avec nos vieilles connaissances et en développer de nouvelles. Québec nous attend: PROFITONS-EN!

Leslie Scott, MD, FRCSC
Président,
Association canadienne de chirurgie pédiatrique
ABOUT THE CANADIAN ASSOCIATION OF PAEDIATRIC SURGEONS

The Canadian Association of Paediatric Surgeons was granted its charter in 1967. Its goal is to improve the surgical care of infants and children. Its areas of interest include all aspects of general and thoracic pediatric surgery with recognition of its unique responsibility to infants born with congenital anomalies and children with malignancies. While its responsibility to pediatric trauma is not unique, it assumes a pivotal role in issues related to pediatric trauma.

The Canadian Association of Paediatric Surgeons presents an opportunity, particularly through its annual meetings, to share information concerning diagnosis, treatment, education and research with regards to its areas of interest. In addition, it assumes responsibility to participate in the education of not only its members, but other members of the community interested in and involved in related aspects of pediatric care.

CAPS ADVOCACY: To help achieve its responsibility to education, research, advocacy and global partnerships, the Association has created several funds where directed donations can be made to support our programs. They include 4 funds: General, Education, Research and Global Partnership Funds. These funds were established and continue to exist through the generosity of individuals and groups, both medical and non-medical, interested in the surgical care of children. The Association solicits annual donations to the funds to maintain an adequate working capital to support all programs and research endeavors endorsed by the CAPS membership. These funds are registered with the federal government and all contributions are fully tax-deductible. It is audited annually.

Contributions to the CAPS Advocacy Funds can be made online at www.caps.ca or send a cheque to:

Dr. B.J. Hancock
CAPS Secretary-Treasurer
Children’s Hospital of Winnipeg
AE401 – 840 Sherbrook Street
Winnipeg, Manitoba R3A 1S1
Email: admin@caps.ca
Telephone: (204) 787-1246 Fax: (204) 787-4618
AU SUJET DE L’ASSOCIATION CANADIENNE DE CHIRURGIE PÉDIATRIQUE

L’Association canadienne de chirurgie pédiatrique a reçu sa charte en 1967. Son objectif est d’améliorer les soins chirurgicaux des nouveau-nés et des enfants. Elle s’intéresse à tous les aspects de la chirurgie pédiatrique générale et thoracique tout en reconnaissant sa responsabilité unique à l’égard des bébés nés avec des anomalies congénitales et des enfants atteints de tumeurs malignes. Bien que sa responsabilité en matière de traumatisms pédiatiques ne soit pas unique, elle exerce un rôle crucial dans les questions relatives à ces traumatismes.

L’Association canadienne de chirurgie pédiatrique offre la possibilité, particulièrement dans le cadre de son assemblée générale annuelle, d’échanger des informations concernant le diagnostic, le traitement, l’éducation et la recherche liés à ses domaines d’intérêt. De plus, elle contribue à l’éducation non seulement de ses propres membres, mais aussi des autres intervenants qui s’intéressent aux soins pédiatiques et qui oeuvrent dans ce domaine.

LES FONDS DE PLAIDOYER: Pour l’aider à remplir ses engagements, l’association a créé les fonds pour le plaidoyer. Il existe 4 fonds de plaidoyer : le fond général, le fond de l’éducation, le fond de la recherche et le fond du partenariat global. Ces fonds ont été établis et continuent d’exister grâce à la générosité d’individus et d’associations, de nature médicale ou autre, intéressés par les soins chirurgicaux aux enfants. L’association sollicite annuellement des dons afin de maintenir les fonds de roulement suffisant pour soutenir nos programmes de plaidoyer approuvés par les membres de l’ACCP. Ces fonds sont enregistrés auprès du gouvernement fédéral et toutes les contributions sont pleinement déductibles d’impôts. Les fonds font l’objet d’une vérification comptable annuelle.

Les dons pour le fonds de plaidoyer peuvent être envoyés par courriel à www.caps.ca ou adressés par chèque à :

Dr. B.J. Hancock
Secrétaire-Trésorière de l’ACCP
Children’s Hospital of Winnipeg
AE401 – 840 Sherbrook Street
Winnipeg, Manitoba R3A 1S1
Email: admin@caps.ca
Telephone: (204) 787-1246 Fax: (204) 787-4618

PRESIDENTS - PRÉSIDENTS

1967-1973    Harvey Beardmore*        Montreal
1973-1975    Colin Ferguson*          Winnipeg
1975-1977    Jim Simpson*             Toronto
1977-1979    Sam Kling*               Edmonton
1979-1981    Pierre-Paul Collin       Montreal
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<td>1983-1985</td>
<td>Gordon Cameron</td>
<td>Hamilton</td>
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<td>1985-1987</td>
<td>Stanley Mercer*</td>
<td>Ottawa</td>
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<td>1987-1989</td>
<td>Alex Gillis</td>
<td>Halifax</td>
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<td>1991-1993</td>
<td>Sigmund H. Ein*</td>
<td>Toronto</td>
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<td>1993-1995</td>
<td>Angus Juckes</td>
<td>Regina</td>
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<td>1995-1997</td>
<td>Jean G. Desjardins</td>
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<td>1997-1999</td>
<td>David P. Girvan</td>
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<td>1999-2001</td>
<td>Ray Postuma</td>
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<td>2001-2003</td>
<td>Mike Giacomantonio</td>
<td>Halifax</td>
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<td>2003-2005</td>
<td>Salam Yazbeck</td>
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<td>2005-2007</td>
<td>Nathan Wiseman</td>
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<td>2007-2009</td>
<td>Geoffrey Blair</td>
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<td>2018-2020</td>
<td>Leslie Scott</td>
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<tr>
<td>2020-2022</td>
<td>David Price</td>
<td>St. John’s</td>
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* deceased/ décédé
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<td>1989-1995</td>
<td>Ray Postuma</td>
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<td>1995-2002</td>
<td>Salam Yazbeck</td>
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<td>2002-2006</td>
<td>Peter G. Fitzgerald</td>
<td>Hamilton</td>
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<td>2006-2011</td>
<td>Juan Bass</td>
<td>Ottawa</td>
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<tr>
<td>2011-2019</td>
<td>BJ Hancock</td>
<td>Winnipeg</td>
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<tr>
<td>2019-2023</td>
<td>Sarah Jones</td>
<td>London</td>
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FOUNDING MEMBERS
MEMBRES FONDATEURS

ALLEN*         Michael
ASHMORE*        Phillip
BEARDMORE*      Harvey
CAMERON         Gordon
COLLIN          Pierre-Paul
DESDJARDINS     Jean G.
DUCHARME        Jacques C.
DUVAL*          Frederick
FALLIS*         James
FERGUSON*       Colin
GILLIS          Alex
GUTTMAN         Frank M.
JUCKES          Angus
KARN*           Gordon
KENNEDY*        Richard
KLIMAN*         Murray
KLING*          Samuel
MARSHALL*       Donald
MARSHALL*       Russell
MERCER*         Stanley
MURPHY*         David
OWEN*           Herbert
SHANDLING*      Barry
SHRAGOVITCH*    Israël
SIMPSON*        James
STEPHENS*       Clinton
THOMSON*        Stuart
TURCOT*         Jacques
BURRINGTON      John
FRASER          Graham

* deceased / décédé

1st ANNUAL MEETING was held January 22, 1969 in VANCOUVER
Le premier CONGRÈS ANNUEL eut lieu le 22 janvier, 1969 à VANCOUVER
THE COAT OF ARMS OF
THE CANADIAN ASSOCIATION OF PAEDIATRIC
SURGEONS

LES ARMOIRIES DE
L’ASSOCIATION CANADIENNE DE CHIRURGIE
PÉDIATRIQUE
**Heraldic Blazon**

Per pale gules and purpure, dexter a scalpel erect entwined by a serpent, sinster a child standing, all argent.

Crest: On the three maple leaves slipped gules and blacked purpure, the date 1967.

Motto: « Je le pensay, Dieu le guarit ».

**Description**

The red and purple of the arms are also the colours of the Royal College of Physicians and Surgeons of Canada and represent the blood met in surgery - arterial and venous. The scalpel with the healing serpent of Aesculapius, and the figure of a well child combine to symbolize the practice of Paediatric Surgery.

The crest is the Canadian maple leaf and the founding date of the Association (1967).

The Motto is a quotation from Ambroise Paré, a father of modern surgery. The sixteenth-century French translates, “I treated him, God cured him”.

**Le Blason**

Au gauche, un bistouri droit entouré d’un serpent alors qu’à droite se tient un enfant, tout argent.

Au sommet se trouvent trois feuilles d’érable ainsi que la date 1967.

Devise: « Je le pensay, Dieu le guarit ».

**Description**

Le rouge et le violet des armoiries sont les couleurs du Collège Royal des Médecins et Chirurgiens du Canada et représentent le sang artériel et veineux vu au cours de la chirurgie. L’association du bistouri avec le serpent guérisseur d’Esculape ainsi qu’avec l’image d’un enfant en bonne santé symbolise la pratique de la chirurgie pédiatrique.

La couronne du blason est la feuille d’érable du Canada et la date de fondation de notre association (1967).

La devise est une citation d’Ambroise Paré, père de la chirurgie moderne.
### Visiting Lecturers:

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>1969</td>
<td>Vancouver</td>
<td>Davenport/Segal</td>
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<tr>
<td>1970</td>
<td>Montreal</td>
<td>F. Wiglesworth</td>
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<tr>
<td>1971</td>
<td>Ottawa</td>
<td>A. Sass-Kortsak</td>
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<tr>
<td>1972</td>
<td>Toronto</td>
<td>MacIntyre</td>
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<tr>
<td>1973</td>
<td>Edmonton</td>
<td>L. Stern</td>
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<td>1974</td>
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<td>J. Folkman</td>
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### Fred MacLeod Lecturers:

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<th>Year</th>
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<tr>
<td>1975</td>
<td>Winnipeg</td>
<td>D. J. Waterston</td>
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<td>D. Pellerin</td>
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<td>1977</td>
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<td>F.D. Stephens</td>
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<td>1978</td>
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<td>J.H. Louw</td>
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<td>1979</td>
<td>Montréal</td>
<td>O. Swenson</td>
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<tr>
<td>1980</td>
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<td>D. Cohen</td>
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<td>1981</td>
<td>Toronto</td>
<td>H.W. Clatworthy</td>
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<td>1982</td>
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<td>P. Mollard</td>
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<td>1983</td>
<td>Calgary</td>
<td>K. Kimura</td>
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<td>1984</td>
<td>Montréal</td>
<td>M. M. Ravitch</td>
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<td>1985</td>
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<td>P. Jones</td>
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<td>A. F. Schärli</td>
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<td>S. L. Gans</td>
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<td>J. G. Raffensperger</td>
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<td>J.C. Molenaar</td>
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<td>K. D. Anderson</td>
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<td>A. G. Coran</td>
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<td>K. W. Ashcraft</td>
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<td>J. A. Tovar</td>
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<td>N. P. Kenny</td>
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<td>1997</td>
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<td>P. K. Donahoe</td>
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<td>Montebello</td>
<td>J. A. O’Neill, Jr</td>
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<tr>
<td>2002</td>
<td>Vancouver</td>
<td>D. Birabwa-Male</td>
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### JPS/Fred MacLeod Lecturers:

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<th>Year</th>
<th>City</th>
<th>Lecturer</th>
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<tr>
<td>2003</td>
<td>Niagara-on-the-Lake</td>
<td>Scott Adzick</td>
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<td>2004</td>
<td>Winnipeg</td>
<td>Keith Georgeson</td>
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<td>2005</td>
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<td>Abdullah Al-Rabeeah</td>
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<td>St- John’s</td>
<td>Charles J. H Stolar</td>
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<td>2008</td>
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<td>Jose Boix-Ochoa</td>
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<td>2009</td>
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<td>Michael Gauderer</td>
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<td>Saskatoon</td>
<td>Hugo A. Heij</td>
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<td>2011</td>
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<td>Marcelo Martinez-Ferro</td>
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<td>2012</td>
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<td>John M. Hutson</td>
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<td>2013</td>
<td>Charlottetown</td>
<td>Keith Oldham</td>
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<td>2014</td>
<td>Montréal</td>
<td>Ronald B. Hirschkl</td>
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<td>2015</td>
<td>Niagara Falls</td>
<td>Kevin P. Lally</td>
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<td>2016</td>
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<td>Shawn Rangel</td>
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<td>Riccardo Superina</td>
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<td>2018</td>
<td>Toronto</td>
<td>Col Catherine “Cady” Coleman</td>
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<tr>
<td>2019</td>
<td>Québec City</td>
<td>Ross Fisher</td>
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</tbody>
</table>
The Canadian Association of Paediatric Surgeons
L’Association canadienne de chirurgie pédiatrique
is pleased to invite
est fière d’inviter
Mr. Ross Fisher
MBChB MSc MPhil FRCS RCPS (Paediatric Surgery)
Consultant Paediatric Surgeon, Sheffield Children’s Hospital
Sheffield, UK
to give the JPS / Fred MacLeod Annual Lecture.
à donner la conférence annuelle JPS/ Fred MacLeod:
« Presentation skills beyond The Matrix »
The visit by La visite du
Mr. Fisher
is made possible with the financial support of
est rendue possible grâce à la générosité de
Elsevier Publishing Company
Ignaz Semmelweiss is widely regarded as the Father of modern infection control. He discovered the increased cause of death in the physician led obstetric unit in Vienna when compared to the midwife led unit next door. The science was excellent and the evidence irrefutable but he died unable to convince his colleagues of the nature and effect of sepsis. A significant factor within the knowledge translation gap in Medicine (and Paediatric Surgery) is the nature of presentations as currently delivered. The implicit beliefs underpinning a presentation are that reading out (a powerpoint) is teaching and the corollary, that listening is learning. The psychological and educational literature is clear that this is false, a virtual reality. Addressing the science behind such erroneous concepts will improve presentation skills, the gap in knowledge translation can be reduced and this will deliver evidence based paediatric surgical practice.

Learning objectives:
1. Understand the science of fail in presentations as they are currently delivered.
2. Understand the p cubed approach to presentation skills
3. Reflection on current learning styles.

This lecture was also sponsored by the Harry S. Morton Lectureship Award from the Royal College of Physicians and Surgeons of Canada.

We are honoured to have Mr. Ross Fisher participate in our 2019 CAPS Annual Meeting Program and look forward to his JPS / Fred MacLeod Lecture.
SPECIAL PRESENTATION

Competence By Design

How this will impact training and practice in Pediatric Surgery

What every Canadian pediatric surgeon needs to know

Farhan Bhanji MD MSc(Ed) FRCPC FAHA
Professor of Pediatrics (Critical Care) McGill University
Associate Director Examination Strategy, Clinician Educator CanMEDS/Simulation
Royal College of Physicians and Surgeons of Canada

Objectives: At the end of this presentation, attendees will be able to
1. describe the rationale for a change to Competency-Based Medical Education
2. outline the anticipated changes to clinical training in Pediatric Surgery
3. discuss the potential pitfalls to residency education in the CBD model

Farhan Bhanji, MD, MSc (Ed), FRCPC, FAHA is a Professor of Pediatrics (Critical Care) at McGill University and the Director of Education at the Steinberg Centre for Simulation and Interactive Learning. He is also the Associate Director of Examination Strategy, a Clinician Educator for CanMEDS, as well as for Simulation at the Royal College of Physicians and Surgeons of Canada (RCPSC). He serves as the education lead in Resuscitation for the Heart and Stroke Foundation of Canada. In the immediate past, he was the Chair of the Education Committee for Emergency Cardiovascular Care at the American Heart Association. Dr. Bhanji contributes to several national and international committees such as the Canadian Pediatric Simulation Network Executive, the Assessment Continuum for Canada, the American Heart Association Emergency Cardiovascular Care Committee, and he is the Vice-Chair of the Education, Implementation and Teams taskforce for the International Liaison Committee on Resuscitation (ILCOR).

His education and research interests include: assessment, the teaching and learning of CanMEDS roles, simulation-based education, optimizing resuscitation related to education, and technology-enhanced instruction to improve clinical teaching. Farhan has 150 publications and abstract presentations, as well as 200 national / international invited presentations. He has previously served as the Director of the Fellowship in Health Professions Education at McGill University, as well as the Fellowship in Pediatric Emergency Medicine. He was the inaugural recipient of the Richard and Sylvia Cruess Faculty Scholar in Medical Education at McGill (Educational Scholarship) and served as a Visiting Professor at the Medical Education Development Center of Gifu University, Japan from January to March 2013.
2019 Global Scholarship Recipient

Dr. Marisa Seepersaud is a visionary pioneer in paediatric surgery in Guyana and an Associate Professor at the University of Guyana. After completing her medical school in Guyana and her paediatric surgery DM specialty training in Jamaica, she returned to the Georgetown Public Hospital in Guyana in 2012. Dr. Seepersaud has led development of the paediatric surgical service and paediatric critical care unit, and has coordinated the paediatric cardiac surgery program in conjunction with a visiting team. In addition to her clinical and hospital responsibilities, Dr. Seepersaud serves on the national Medical Council and University Council, and Chairs the program committee for the annual Guyana Medical Scientific Conference. She will be a Visiting Scholar at McMaster Children’s Hospital during her stay in Canada.
RESIDENTS’ OR MEDICAL STUDENTS’ PAPERS
A panel of members from the Publication Committee adjudicates the oral presentations presented by medical students or residents. A panel of members from the Program Committee adjudicates the posters presented by medical students or residents.

PRÉSENTATIONS DES RÉSIDENTS OU DES ÉTUDIANTS EN MÉDICINE
Les présentations orales faites par les étudiants ou les résidents sont jugées par un jury constitué des membres du comité de publication. Les présentations d’affiches faites par les étudiants ou les résidents sont jugées par un jury constitué des membres du comité de programme.

Trainee Prizes: CAPS 2018, Toronto Ontario, September 26-29, 2018

A. President’s Prize - Prix Du Président
For Outstanding Presentation by a Student- Pour La Meilleure Présentation Par Un(E) Étudiant(E)

Name: Christopher Dethlefs (Supervisor: Dr. Robert Cusick)
Paper Title: Conservative management of urachal anomalies
Institution: Children’s Hospital and Medical Center (Omaha, Nebraska, USA)
Prize: Monetary award

B. Poster Prizes

First: Ian Jones (Supervisors: Dr. Nigel Hall)
Paper Title: Remote ischaemic conditioning as a novel therapeutic intervention for experimental NEC
Institution: University of Southampton (Southampton, United Kingdom)
Prize: 1-year subscription to Seminars in Pediatric Surgery

Second: Natalie Velez (Supervisor: Dr. Jorge J Zequeira)
Paper Title: Laparoscopic pyloromyotomy technique variation in a low resource pediatric tertiary hospital post Hurricane Maria
Institution: University of Puerto Rico School of Medicine (San Juan, Puerto Rico)
Prize: 1-year subscription to Journal of Pediatric Surgery

C. Oral Presentations

First: Martina Mudri (Supervisor: Dr. Andreana Bütter)
Paper Title: The effects of tracheal occlusion on Wnt signaling in a rabbit model of congenital diaphragmatic hernia
Institution: Children’s Hospital, London Health Sciences Centre (London, Ontario)
Prize: 1-year subscription to Seminars in Pediatric Surgery
Second: Aodhnait Fahy (Supervisor: Dr. Justin T Gerstle)
*Paper Title:* Multifocal hepatoblastoma: what is the risk of recurrent disease in the remnant liver?
*Institution:* Hospital for Sick Children (Toronto, Ontario)
*Prize:* 1-year subscription to *Journal of Pediatric Surgery*

D. Prix pour le meilleur effort de bilinguisme / Bilingualism Prize

*Nom/Name:* Samuel Jessula (Supervisor: Dr. Natalie Yancher)
*Titre de la présentation/Paper Title:* Where to start? Traumatic injury prevention priority scores in Canadian children.
*Institution:* Dalhousie University (Halifax, Nova Scotia)
*Prix/Prize:* Monétaire/monetary

E. Innovation Prize

*Name:* Lina Antounians (Supervisor: Dr. Augusto Zani)
*Paper Title:* GMP-grade extracellular vesicles derived from clinically compliant human amniotic fluid stem cells regenerate the lung epithelium in a model of pulmonary hypoplasia.
*Institution:* Hospital for Sick Children (Toronto, Ontario)
*Prize:* Monetary
THE CANADIAN ASSOCIATION OF PAEDIATRIC SURGEONS WOULD LIKE TO ACKNOWLEDGE THE FINANCIAL SUPPORT OF THE FOLLOWING SPONSORS

L’ASSOCIATION CANADIENNE DE CHIRURGIE PÉDIATRIQUE REMERCIE LES COMMANDITAIRES POUR LEUR CONTRIBUTION

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Commanditaire de la conférence JPS/Fred MacLeod et des prix

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B.J. Hancock
Secretary-Treasurer
ABBREVIATIONS

O  oral presentation- présentation orale
R  resident paper- présentation par résident
C/T case/technique report- présentation de cas ou de technique
P  poster presentation- présentation d’affiche
O, R, P Adjudicated- éligible pour les prix
C/T Not adjudicated (except for bilingual effort)- non-éligible pour les prix (sauf pour le bilinguisme)
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenters</th>
<th>Modifiers</th>
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<tr>
<td>13:00-13:15</td>
<td><strong>President's Welcome - Dr. Leslie Scott</strong></td>
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<tr>
<td>13:15-14:15</td>
<td><strong>Scientific Session #1 Oral Presentations: Foregut/Thoracic</strong></td>
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<tr>
<td>1 OR</td>
<td>13:15 - 13:22  <strong>The development of multiorgan dysfunction in CDH-ECMO neonates is associated with the level of pre-ECMO support</strong></td>
<td>Patrick T Delaplain(^1,2), William Duong(^2), Danh V Nguyen(^4), Louis Ehwerhemuep.(^3), Matteo Di Nardo(^5), Tim Jancelewicz(^6), William Feaster(^3), Saeed U Awan(^2,7), Peter T Yu(^2,7), Yigit S Guner(^2,7)</td>
<td>Rob Baird, David Price</td>
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<tr>
<td>2 OR</td>
<td>13:23 - 13:30  <strong>Nationwide analysis of mortality and hospital readmissions in esophageal atresia</strong></td>
<td>Hallie Quiroz(^1), Brent Willobee(^1), Anthony Ferrantella(^1), Joshua Parreco(^1), David Lasko(^2), Eduardo A Perez(^1), Juan E Sola(^1), Chad Thorson(^1)</td>
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<tr>
<td>4 OR</td>
<td>13:39 - 13:46  <strong>The beneficial effect of amniotic fluid stem cell exosome administration in a novel in vitro model of pulmonary vascular remodeling</strong></td>
<td>Areti Tzanetakis(^1,2), Lina Antounians(^1,2), Louise Montalva(^1,2), Augusto Zani(^1,2)</td>
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<td>OR</td>
<td>13:47 - 13:54</td>
<td>Accuracy of prenatal and postnatal imaging for management of congenital lung malformations</td>
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<td>6</td>
<td>O</td>
<td>13:55 - 14:02</td>
<td>Long gap esophageal atresia: Inference of cervical esophagostomy on outcomes</td>
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<td>7</td>
<td>OR</td>
<td>14:03 – 14:10</td>
<td>MiR-200b knockout mice have vascular remodeling associated with pulmonary hypertension</td>
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<td>8</td>
<td>OR</td>
<td>14:11 – 14:18</td>
<td>The aryl hydrocarbon receptor (AHR) is involved in the pathogenesis of congenital diaphragmatic hernia (CDH)</td>
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<td>9</td>
<td>OR</td>
<td>14:19 – 14:26</td>
<td>Improving the diagnostic accuracy of appendicitis using a multidisciplinary pathway</td>
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<tr>
<td>Time</td>
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<td>OR 14:45 – 15:54</td>
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| 14:45 – 14:52 | OR | **Pediatric blunt cerebrovascular injuries: a national trauma database study**  
Kate B Savoie¹, Junxin Shi², Krista Wheeler², Henry Xiang², Brian D Kenney¹  
¹Department of Pediatric Surgery, Nationwide Children’s Hospital, Columbus, OH, United States  
²Center for Injury Research and Policy at the Research Institute, Nationwide Children’s Hospital, Columbus, OH, United States |
| 14:53 – 15:01 | O | **Do pedestrian countdown signals reduce pedestrian-motor vehicle collisions or pedestrian injury severity? A before-after study**  
Arielle Weir¹, Viviane Grandpierre¹, Carolyn Wayne¹, Nicole Travis², Ahmed Nasr¹,³  
¹Children’s Hospital of Eastern Ontario, Department of Surgery, Ottawa, ON, Canada  
²University of Ottawa, Ottawa, ON, Canada  
³University of Ottawa, Faculty of Medicine, Ottawa, ON, Canada |
| 15:02 – 15:09 | O | **Melanocytic malignancies in children: analysis from a national cancer database**  
Saleem Islam, Daniel Delitto  
University of Florida, Department of Surgery, Division of Pediatric Surgery, Jacksonville, FL, United States |
| 15:10 – 15:17 | OR | **Human and economic costs of pediatric firearm injury**  
Hallie J Quiroz¹, Joshua P Parreco¹, Liann Casey¹, Brent A Willobee¹, Rishi Rattan¹, David S Lasko², Eduardo A Perez¹, Juan E Sola¹, Chad M Thorson¹  
¹University of Miami Miller School of Medicine, Miami, FL, United States  
²South Florida Pediatric Surgeons, Plantation FL, United States |
| 15:18 – 15:25 | OR | **The unborn fetus: the unrecognized victim of trauma during pregnancy**  
Michelle B Mulder¹, Hallie J Quiroz¹, Emily L Ryon¹, Matthew S Sussman¹, Wendy J Yang¹, David S Lasko², Eduardo A Perez¹, Kenneth G Proctor¹, Juan E Sola¹, Chad M Thorson¹  
¹University of Miami Miller School of Medicine, Miami, FL, United States  
²South Florida Pediatric Surgeons, Plantation FL, United States |
A first provincial analysis of Québec’s bicycle helmet use and its impact on traumatic brain injury and hospital admission risks in children

Hussein Wissanji1, Ruxandra Penta1, Debbie Friedman2,3,4, Marianne Beaudin5, Claude Cyr6, Elena Guadagno1, Glenn Keays1, Amber Mehmood7, Eric Mercier8, Dan Poenaru1, Natalie L Yanchar9, Pramod Puligandla1

1Division of Pediatric General and Thoracic Surgery, Montréal Children’s Hospital, McGill University Health Centre, Montréal, QC, Canada
2Trauma Programs, Montréal Children’s Hospital, McGill University Health Centre, Montréal QC, Canada
3Canadian Hospitals Injury Reporting and Prevention Program, Montréal, QC, Canada- Affiliated with Health Canada
4Department of Pediatrics and Pediatric Surgery, Faculty of Medicine, McGill University, Montréal QC, Canada
5Division of Pediatric Surgery, CHU Sainte-Justine, Université de Montréal, Montréal, QC, Canada
6Department of Pediatrics, Faculty of Medicine and Health Sciences, University of Sherbrooke, Sherbrooke, QC, Canada
7Johns Hopkins International Injury Research Unit, Health Systems Program, Department of International Health, School of Public Health, Johns Hopkins University, Baltimore, Maryland, United States
8Department of Family and Emergency Medicine, Faculty of Medicine, Laval University, Québec City, QC, Canada
9University of Calgary, Department of Surgery, Division of Pediatric Surgery, Alberta Children’s Hospital, Calgary, AB, Canada

Drug repurposing targeting Pannexin1 to treat rhabdomyosarcoma

Xiao Xiang1,2, Marie-Eve St-Pierre1, Sanaz Karami1, Stephanie Langlois3, Alex MacKenzie1,2,4,5, Kyle N Cowan1,2,3

1Molecular Biomedicine Program, Children’s Hospital of Eastern Ontario, Ottawa, ON, Canada
2Department of Cellular and Molecular Medicine, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada
3Division of Paediatric Surgery, Department of Surgery, Children’s Hospital of Eastern Ontario, University of Ottawa, Ottawa, ON, Canada
4Division of Endocrinology, Department of Pediatrics, Children’s Hospital of Eastern Ontario, University of Ottawa, Ottawa, ON, Canada
5Department of Pediatrics, Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada

Acquired tracheo-esophageal fistula in children: our clinical experience in diagnosis and management
| 18 | PR | 15:50 – 15:54 | Post-operative pain control following minimally invasive repair of pectus excavatum in pediatric patients: a systematic review |
| Arvind Sinha, Rahul Saxena, Manish Pathak, Kirti Rathod, Avinash Jadhav |
| All India Institute of Medical Sciences, Jodhpur, India |
| Tessa Robinson\textsuperscript{1,2}, Victoria Archer\textsuperscript{3}, Arani Muthurajah \textsuperscript{1,2}, Deepa Kattail\textsuperscript{4,5}, Peter Fitzgerald\textsuperscript{1,2,4}, J Mark Walton\textsuperscript{1,2,4} |
| \textsuperscript{1}Division of Pediatric General Surgery, Department of Surgery, McMaster University, Hamilton, ON, Canada |
| \textsuperscript{2}McMaster Pediatric Surgery Research Collaborative, McMaster University, Hamilton, ON, Canada |
| \textsuperscript{3}Division of General Surgery, Department of Surgery, McMaster University, Hamilton, ON, Canada |
| \textsuperscript{4}Department of Anesthesia, McMaster University, Hamilton, ON, Canada |
| \textsuperscript{5}McMaster Children’s Hospital, Hamilton, ON, Canada |

| 19 | PR | 15:55 – 15:59 | Magnamosis for esophageal atresia is associated with an increased number of dilatations |
| Emma Wolfe\textsuperscript{1}, Mazen Zidane\textsuperscript{1}, BJ Hancock\textsuperscript{1}, Suyin Lum Min\textsuperscript{1}, Mario Zaritzky\textsuperscript{7}, Richard Keijzer\textsuperscript{3} |
| \textsuperscript{1}University of Manitoba, Winnipeg, MB, Canada |
| \textsuperscript{2}University of Chicago, Chicago, IL, United States |

| 20 | P | 16:00 – 16:04 | Effect of body position on three-dimensional scanning technique for assessment of pectus carinatum |
| Tomasz Bugajski\textsuperscript{1}, Bahareh Vafadar\textsuperscript{2}, Madeleine Mackinnon\textsuperscript{3}, Alberto Nettel-Aguirre\textsuperscript{4}, Marc Schneider\textsuperscript{3}, Jennifer Lam\textsuperscript{5}, Mary Brindle\textsuperscript{5}, Steven Lopushinsky\textsuperscript{5}, Janet Ronsky\textsuperscript{6} |
| \textsuperscript{1}Biomedical Engineering Graduate Program, University of Calgary, AB, Canada |
| \textsuperscript{2}Zymetrix - Biomaterials & Tissue Engineering Technology Development Centre, University of Calgary, AB, Canada |
| \textsuperscript{3}Braceworks Custom Orthotics Inc., Calgary, AB, Canada |
| \textsuperscript{4}Department of Pediatrics, University of Calgary, AB, Canada |
| \textsuperscript{5}Department of Pediatric Surgery, University of Calgary, AB, Canada |
| \textsuperscript{6}Mechanical and Manufacturing Engineering, University of Calgary, AB, Canada |

<p>| 21 | P | 16:05 – 16:09 | Impact of surgical repair on cardiac function in newborn infants with high-risk congenital diaphragmatic hernia |
| AC Massolo, L Valfre, P Gliberti, A Toscano, I Capolupo, A Braguglia, A Dotta, P Bagolan, F Morini |
| Bambino Gesù Children’s Hospital, IRCCS, Rome, Italy |</p>
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| 22   | PR  | 16:10 – 16:14 | Assisted reproductive technology is not associated with giving birth to a baby with congenital diaphragmatic hernia  
Gabrielle Derraugh, Mathew Levesque, Suyin A Lum Min, Melanie I Morris, Anna Shawyer, Richard Keijzer  
Department of Surgery, Division of Pediatric Surgery, Pediatrics and Child Health and Children’s Hospital Research Institute of Manitoba, University of Manitoba, Winnipeg, MB, Canada |
| 23   | PR  | 16:15 – 16:19 | Is the physical activity of healthy children a valid baseline for the preoperative physical activity of children undergoing elective surgery?  
Benjamin T Many\textsuperscript{1,2}, Yazan Rizeq\textsuperscript{1}, Soyang Kwon\textsuperscript{1}, Monica Langer\textsuperscript{1}, Jonathan Vacek\textsuperscript{1,2}, Fizan Abdullah\textsuperscript{1,2}, Hassan Ghomrawi\textsuperscript{1,2}  
\textsuperscript{1}Division of Pediatric Surgery, Ann and Robert H. Lurie Children’s Hospital of Chicago, Chicago, IL, United States  
\textsuperscript{2}Institute for Public Health and Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL, United States |
| 24   | P   | 16:20 – 16:24 | Quantifying the association between inpatient ambulation and recovery for postoperative pectus patients  
Yazan Rizeq\textsuperscript{1}, Benjamin T Many\textsuperscript{1}, Jonathan Vacek\textsuperscript{1}, Soyang Kwon\textsuperscript{1}, Monica Langer\textsuperscript{1}, Seth Goldstein\textsuperscript{1}, Fizan Abdullah\textsuperscript{1,2}, Hassan Ghomrawi\textsuperscript{1,2}  
\textsuperscript{1}Ann and Robert H Lurie Children’s Hospital of Chicago, Chicago, IL, United States  
\textsuperscript{2}Institute for Public Health and Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL, United States |
| 25   | P   | 16:25 – 16:29 | Comparison between laparoscopic versus open surgical repair of congenital Morgagni hernia: a single center study  
Amar Alnaqi\textsuperscript{1}, Esmaeel Taqi\textsuperscript{2}  
\textsuperscript{1}Department of Surgery, Health Sciences Center, Kuwait University, Kuwait  
\textsuperscript{2}Ibn Sina Hospital, Ministry of Health, Kuwait |
| 26   | PR  | 16:30 – 16:34 | Congenital diaphragmatic hernia: prevalence and risk factors across the world  
Monica Paoletti, Gabriele Raffler, Maria Sole Gaffi, Louise Montalva, Augusto Zani  
Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada |

**Track B- Appendicitis/Trauma/Quality Moderators: Ross Fisher, Margo Hendrickson**

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| 27   | PR  | 15:45 – 15:49 | Hospital costs for childhood intussusception in Ontario from 2003-2016: a population-based study  
Mercedes Pilkington\textsuperscript{1}, Edrea Khong\textsuperscript{2}, Katherine Lajkosz\textsuperscript{3}, Susan Brogley\textsuperscript{1,3}, Andrea Winthrop\textsuperscript{1}, Mila Kolar\textsuperscript{1}  
\textsuperscript{1}Queen’s University, Department of Surgery, Kingston, ON, |
|   |   | 15:50 – 15:54 | **Screening for alcohol and substance use in pediatric trauma patients: a retrospective review**  
  
  *Tessa Robinson*<sup>1,2</sup>, Christopher Tarzi<sup>1</sup>, Xiaoxi Zhou<sup>1</sup>, Karen Bailey<sup>1,2,3</sup>  
  
  <sup>1</sup>McMaster Pediatric Surgery Research Collaborative, McMaster University, Hamilton, ON, Canada  
  <sup>2</sup>Division of Pediatric General Surgery, Department of Surgery, McMaster University, Hamilton, ON, Canada  
  <sup>3</sup>McMaster Children’s Hospital, Hamilton, ON, Canada |
|---|---|---|---|
|   | PR | 15:55 – 15:59 | **Comparison of drugs used for intubation of pediatric trauma patients**  
  
  Martina Mudri, Andrew Williams, Neil Merritt  
  Children’s Hospital, London Health Sciences Centre, Division of Pediatric Surgery, London, ON, Canada |
|   | PR | 16:00 – 16:04 | **Postoperative opioid discharge prescription practices by the pediatric general surgery service at a Canadian tertiary pediatric centre**  
  
  Maeve O’Neill Trudeau, Elke Ruttenstock, Annie Fecteau  
  Division of General and Thoracic Surgery, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada |
|   | PR | 16:05 – 16:09 | **To cut or not to cut and other dilemmas: optimizing management of complex appendicitis**  
  
  Edrea Khong, Eveline Lapidus-Kroll, Annie Fecteau  
  Division of General and Thoracic Surgery, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada |
|   | PR | 16:10 – 16:14 | **Management and outcomes of children with abdominal pain and non-visualized appendix on ultrasound**  
  
  Jordan McKean, Suniah Ayub, Janice Taylor, Moiz Mustafa, Shawn Larson, Saleem Islam  
  Division of Pediatric Surgery, Department of Surgery, College of Medicine, University of Florida, Gainsville, FL, United States |
|   | PR | 16:15 – 16:19 | **Failure to thrive: the socioeconomics of pediatric gastrostomy complications**  
  
  Alyssa Mowrer<sup>1</sup>, Joseph Esparaz<sup>1</sup>, Ryan Nierstedt<sup>2</sup>, Katelyn Zumpf<sup>3</sup>, Shawn Chakraborty<sup>2</sup>, Richard Pearl<sup>1,2</sup>, Charles Aprahamian<sup>1,2</sup>, Paul Jeziorkczak<sup>1,2</sup>  
  <sup>1</sup>Department of Surgery, University of Illinois College of Medicine at Peoria, Peoria, IL, United States  
  <sup>2</sup>Division of Pediatric Surgery, Children’s Hospital of Illinois at OSF St Francis Medical Center, Peoria, IL, United States |
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<tbody>
<tr>
<td>16:20 – 16:24</td>
<td>PR</td>
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<td><strong>Pediatric trauma triage: who is the right patient?</strong></td>
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<td>Jump Trading Simulation &amp; Education Center, Peoria, IL, United States</td>
<td>Natalie L Yanchar(^1), Sydney Candy(^2)</td>
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<td>(^1)Department of Surgery, University of Calgary, Calgary, AB, Canada</td>
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<td>(^2)Queen’s University, Kingston, ON, Canada</td>
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<tr>
<td>16:25 – 16:29</td>
<td>PR</td>
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<td><strong>An assessment of provider satisfaction with the use of a standardized visual aid for informed consent for appendectomy in children</strong></td>
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<td>Jump Trading Simulation &amp; Education Center, Peoria, IL, United States</td>
<td>Brittany L Johnson, Eric H Rosenfeld, Monica E Lopez, Mary L Brandt</td>
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<td>Division of Surgery, Michael E DeBakey Department of Surgery, Baylor College of Medicine, Texas Children’s Hospital, Houston, TX, United States</td>
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<tr>
<td>16:30 – 16:34</td>
<td>PR</td>
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<td><strong>Management of the normal-appearing appendix during laparoscopy for clinically suspected acute appendicitis in the pediatric population</strong></td>
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<td>Jump Trading Simulation &amp; Education Center, Peoria, IL, United States</td>
<td>Kathleen Logie(^1), Tessa Robinson(^2,3), Lisa VanHouwelingen(^2,3,4)</td>
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<td>(^1)Division of General Surgery, Department of Surgery, McMaster University, Hamilton, ON, Canada</td>
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<td>(^2)McMaster Pediatric Surgery Research Collaborative, McMaster University, Hamilton, ON, Canada</td>
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<td>(^3)Division of Pediatric General Surgery, Department of Surgery, McMaster University, Hamilton, ON, Canada</td>
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<td>(^4)McMaster Children’s Hospital, Hamilton, ON, Canada</td>
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**Special Program: Dr. Farhan Bhanji**

**Competence By Design**

How this will impact training and practice in Pediatric Surgery  
What every Canadian pediatric surgeon needs to know

17:00 – 18:00

**Welcome Reception**

**FRIDAY, SEPTEMBER 20, 2019**

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<th>Time</th>
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<tr>
<td>08:00 – 08:07</td>
<td>OR</td>
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<td><strong>Long-term outcomes of severe surgical necrotizing enterocolitis</strong></td>
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<td>Sam M Han(^1,2), Jamie Knell(^1,2), Owen Henry(^2), Heather Riley(^2), Steven J Staffa(^2), Biren P Modi(^1,2), Tom Jaksic(^1,2)</td>
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<td></td>
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<td></td>
<td>(^1)Center for Advanced Intestinal Rehabilitation, Boston Children’s Hospital and Harvard Medical School, Boston, MA, United States</td>
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<td>(^2)Department of Surgery, Boston Children’s Hospital and Harvard Medical School, Boston, MA, United States</td>
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<tr>
<td>38</td>
<td>OR</td>
<td>08:08 - 08:15</td>
<td>Gastrografin for the management of paediatric adhesive small bowel obstruction: a systematic review</td>
</tr>
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</table>
| 39      | O    | 08:16 - 08:23| Use of transient elastography to determine liver fibrosis in pediatric intestinal failure                                                  | Christina Belza¹, Rose Chami², Iram Siddiqui², Paul W Wales¹, Yaron Avitzur⁷                 | ¹Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada  
²Division of Pathology and Lab Medicine, The Hospital for Sick Children, Toronto, ON, Canada  
³Division of Gastroenterology, Hepatology and Nutrition, The Hospital for Sick Children, Toronto, ON, Canada |
| 40      | OR   | 08:24 – 08:31| Pasteurized human breast milk exosomes attenuate the intestinal damage in necrotizing enterocolitis                                       | Hiromu Miyake¹,², Manvi Bhalla¹, Shogo Seo¹, Bo Li¹, Carol Lee¹, Agostino Pierro¹      | ¹Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada  
²Department of Pediatric Surgery, Shizuoka Children’s Hospital, Aoi Ward, Shizuoka, Japan |
| 41      | OR   | 08:32 – 08:39| Diuresis as an indicator of the resolution of ileus                                                                                   | Robin Riley¹, Sarah Kelso¹, Thomas Ahern², James Murphy¹                                 | ¹University of Vermont Medical Center, Burlington, VT, United States  
²University of Vermont, Burlington, VT, United States |
| 42      | O    | 08:40 – 08:47| Short-chain fructo-oligosaccharides modify the microbiota in experimental necrotizing enterocolitis                                   | Haitao Zhu¹,²,³, Carol Lee¹,², Richard Y Wu¹,⁴, Jia Liu¹,²,³, Bo Li¹,², Mashriq Alganabi¹,²,³, Maarten Janssen Lok¹,², Kathene C Johnson-Henry³, Philip M Sherman⁴,⁵,⁶,⁷, Agostino Pierro¹,²,⁸ | ¹Translational Medicine Program, The Hospital for Sick Children, Toronto, ON, Canada  
²Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada  
³Department of Pediatric Surgery, Children’s Hospital of Fudan University, Shanghai, China  
⁴Cell Biology Program, The Hospital for Sick Children, Toronto, ON, Canada  
⁵Division of Gastroenterology, Hepatology and Nutrition, The Hospital for Sick Children, Toronto, ON, Canada  
⁶Department of Laboratory Medicine and Pathobiology, Faculty of Medicine, University of Toronto, Toronto, ON, Canada  
⁷Faculty of Dentistry, University of Toronto, Toronto, ON, Canada  
⁸Department of Surgery, University of Toronto, Toronto, ON, Canada |
Transcriptome analysis of the intestinal regeneration network in necrotizing enterocolitis

Haitao Zhu\textsuperscript{1,2,3}, Carol Lee\textsuperscript{1,2}, Bo Li\textsuperscript{1,2}, Agostino Pierro\textsuperscript{1,2,4}

\textsuperscript{1}Translational Medicine Program, The Hospital for Sick Children, Toronto, ON, Canada
\textsuperscript{2}Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada
\textsuperscript{3}Department of Pediatric Surgery, Children’s Hospital of Fudan University, Shanghai, China
\textsuperscript{4}Department of Surgery, Faculty of Medicine, University of Toronto, Toronto, ON, Canada

Predictors of D-lactic acidosis in children with small bowel bacterial overgrowth and intestinal failure

Jamie Knell\textsuperscript{1,2}; Sam M Han\textsuperscript{1,2}; Megan McGivney\textsuperscript{1,2}; Heather B. Riley\textsuperscript{2}; Owen Henry\textsuperscript{2}; Steven J Staffa\textsuperscript{2}; Biren P Modi\textsuperscript{1,2}; Tom Jaksic\textsuperscript{1,2}

\textsuperscript{1}Center for Advanced Intestinal Rehabilitation, Boston Children’s Hospital and Harvard Medical School, Boston, MA, United States
\textsuperscript{2}Department of Surgery, Boston Children’s Hospital and Harvard Medical School, Boston, MA, United States

JPS/Fred MacLeod Lecture:
Mr. Ross Fisher, Consultant Paediatric Surgeon,
Sheffield Children’s Hospital, Sheffield, United Kingdom.
“Presentation skills beyond The Matrix”.

Ignaz Semmelweis is widely regarded as the Father of modern infection control. He discovered the increased cause of death in the physician led obstetric unit in Vienna when compared to the midwife led unit next door. The science was excellent and the evidence irrefutable but he died unable to convince his colleagues of the nature and effect of sepsis. A significant factor within the knowledge translation gap in Medicine (and Paediatric Surgery) is the nature of presentations as currently delivered. The implicit beliefs underpinning a presentation are that reading out (a powerpoint) is teaching and the corollary, that listening is learning. The psychological and educational literature is clear that this is false, a virtual reality. Addressing the science behind such erroneous concepts will improve presentation skills, the gap in knowledge translation can be reduced and this will deliver evidence based paediatric surgical practice.

Learning objectives:
1. Understand the science of fail in presentations as they are currently delivered.
2. Understand the p cubed approach to presentation skills
3. Reflection on current learning styles.

This lecture was also sponsored by the Harry S. Morton Lectureship Award from the Royal College of Physicians and Surgeons of Canada.

Coffee Break

CAPS Ethics Session:
“Caring for Indigenous Children: A CAPS Perspective”
Opening prayer: Huron-Wenda, Elder from Wendake
Moderator: Dr. Melanie Morris
**Guest speaker:** Dr. Stanley Vollant  
**Panel Members:** Dr. Melanie Morris and Dr. Stanley Vollant

This session will provide a historical overview of the Indigenous people of Canada as it relates to health and healthcare delivery. Speakers will shed light on the health-related issues that Indigenous children face and possible solutions that may improve the current situation. Roles that pediatric surgeons play will be highlighted in these discussions.

**Learning Objectives:**
After this session, in relation to Indigenous children of Canada and Pediatric Surgeons, the learner will be able to:
1. Begin to understand the history of the Indigenous people of Canada particularly in healthcare  
2. Identify social determinants of health as it applies to Indigenous children  
3. Highlight the surgical needs and the current gaps in care.  
4. List possible solutions to improve the delivery of care.

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<th>12:30 -12:45</th>
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| 12:45 - 13:15 | **Video/Technique Session**  
**Moderators:** Kurt Heiss, Andrea Winthrop |
| 45 | T | 12:45 – 12:52 | A Combined sternotomy/laparotomy approach in central tendon diaphragmatic hernia repair  
Shin Miyata¹, Shahrzad Joharifard¹, Hussein Wissanji², Mona Beaunoyer³, Michel Lallier¹  
¹Department of Surgery, CHU Ste-Justine, University of Montréal, Montréal, QC, Canada  
²Division of Pediatric General and Thoracic Surgery, Montréal Children’s Hospital, McGill University Health Centre, Montréal, QC, Canada |
| 46 | TR | 12:53 – 13:00 | Intra-operative near infrared spectroscopy imaging: a novel strategy for assessing and predicting intestinal viability in emergency pediatric surgery  
Oluwatomiayö Daodu, Paul Beaudry  
Department of Surgery, University of Calgary, Alberta Children’s Hospital, Calgary, AB, Canada |
| 47 | TR | 13:01 – 13:08 | Thrombolysis and thrombectomy rescue therapy by combined intra-venous and intra-arterial route in infants with superior mesenteric vein thrombosis  
Francesco Morini¹, Kejd Bici¹, Antonella Diamanti², Filippo Torroni³, Patrizia Bozza¹, Pietro Bagolan¹, Fabio Fusaro¹  
¹Department of Medical and Surgical Neonatology, Bambino Gesù Children’s Hospital, IRCCS, Rome, Italy  
²Gastroenterology-Hepatology and Nutrition Unit, Bambino Gesù Children’s Hospital, IRCCS, Rome, Italy  
³Digestive Endoscopy and Surgery Unit, Bambino Gesù Children’s Hospital, IRCCS, Rome, Italy |
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| 13:15 - 14:15 | Scientific Session 4- Hindgut/HPB/Education  
Moderators: Kurt Heiss, Andrea Winthrop | |

### 48  
**13:15 – 13:22**  
*Pull-through procedure in children with Hirschsprung’s disease: a nationwide analysis on postoperative outcomes*  
Hallie Quiroz¹, Joshua P Parreco¹, Chad Thorson¹, David Lasko², Holly L Neville¹, Eduardo A Perez¹, Juan E Sola¹  
¹University of Miami Miller School of Medicine, Miami, FL, United States  
²South Florida Pediatric Surgeons, Plantation FL, United States

### 49  
**13:23 – 13:30**  
*Restoration of portal venous flow leads to improvement of liver masses in patients with an Abernethy malformation*  
Caroline Lemoine¹, Annika Nilsen², Katherine Brandt¹, Riccardo Superina¹  
¹Division of Transplant Surgery, Ann & Robert H Lurie Children’s Hospital of Chicago, Northwestern University, Feinberg School of Medicine, Chicago, IL, United States  
²Northwestern University, Feinberg School of Medicine, Chicago, IL, United States

### 50  
**13:30 – 13:37**  
*The evolution of early liver biopsy findings in babies with jaundice may delay the diagnosis and treatment of biliary atresia*  
Caroline Lemoine¹, Katherine Brandt¹, Hector Melin-Aldana², Riccardo Superina¹  
¹Division of Transplant Surgery, Ann & Robert H Lurie Children’s Hospital of Chicago, Northwestern University, Feinberg School of Medicine, Chicago, IL, United States  
²Department of Pathology, Ann & Robert H. Lurie Children’s Hospital of Chicago, Northwestern University, Feinberg School of Medicine, Chicago, IL, United States

### 51  
**13:38 – 13:45**  
*Is there a need for a formal gynaecology curriculum in a paediatric surgery training program? A needs assessment*  
Tara D Justice¹, Robert J Baird²,³, Nicole J Todd¹,²,⁴  
¹Department of Obstetrics & Gynaecology, University of British Columbia, Vancouver, BC, Canada  
²BC Children’s Hospital, Vancouver, BC, Canada  
³Division of Pediatric Surgery, Department of Surgery, University of British Columbia, Vancouver, BC, Canada  
⁴Division of Gynaecologic Specialities, Department of Obstetrics and Gynaecology, University of British Columbia, Vancouver, BC, Canada

### 52  
**13:46 – 13:53**  
*Transanal endorectal pull-through for Hirschsprung’s disease: neonatal experience of a tertiary care center*
### Neonatal treatment of Hirschsprung disease: does younger age at surgery increase the risks?

**Laura Valfre, Andrea Conforti, Chiara Iacusso, Barbara Daniela Iacobelli, Fabio Fusaro, Francesco Morini, Pietro Bagolan**  
Department of Medical and Surgical Neonatology, Bambino Gesù Children’s Hospital, Rome, Italy

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<tr>
<td>13:54</td>
<td>O</td>
<td>Laura Valfre, Chiara Iacusso, Barbara Daniela Iacobelli, Andrea Conforti, Fabio Fusaro, Francesco Morini, Pietro Bagolan</td>
<td>Department of Medical and Surgical Neonatology, Bambino Gesù Children’s Hospital, Rome, Italy</td>
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### SATURDAY, SEPTEMBER 21, 2019

### CAPS Annual Business Meeting

#### 09:30 - 10:45

**Scientific Session 5- General/Appendicitis/Global**  
**Moderators:** Kris Milbrandt, Augusto Zani

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<tbody>
<tr>
<td>09:30</td>
<td>O</td>
<td>Development of a decision aid for pediatric surgery: interval appendectomy</td>
<td>Viviane Grandpierre, Arielle Weir, Juan Bass, Marcos Bettolli, Ahmed Nasr</td>
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Children’s Hospital of Eastern Ontario, Ottawa, ON, Canada

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<tbody>
<tr>
<td>09:38</td>
<td>OR</td>
<td>Stool samples can be used to characterize the microbiota of the more proximal small bowel in infants with short bowel syndrome</td>
<td>Hannah G Piper¹, Laura A Coughlin², Van Nguyen², Nandini Channabasappa², Andrew Y Koh ³, ⁴</td>
</tr>
</tbody>
</table>

¹Department of Surgery, University of British Columbia, Vancouver, BC, Canada  
²Department of Pediatrics, University of Texas Southwestern Medical Center, Dallas, TX, United States Medical Center, Dallas, TX, United States  
³Harold C. Simmons Cancer Center, University of Texas, Southwestern Medical Center, Dallas, TX, United States  
⁴Department of Microbiology, University of Texas, Southwestern Medical Center, Dallas, TX, United States

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<tr>
<td>09:46</td>
<td>O</td>
<td>Open surgical cut-down versus percutaneous central venous catheterization and associated complications in pediatric populations: a systematic review and meta-analysis</td>
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<tr>
<td>09:54</td>
<td>OR</td>
<td>Predictors for spontaneous closure of umbilical hernia in children</td>
<td>Arielle Weir¹, Viviane Grandpierre¹, Ahmed Nasr¹,²</td>
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<td>¹Children’s Hospital of Eastern Ontario, Ottawa, ON, Canada</td>
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<td>²University of Ottawa, Faculty of Medicine, Ottawa, ON, Canada</td>
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<td>10:02</td>
<td>OR</td>
<td>Implementing a clinical practice guideline can change surgeon practice in</td>
<td>Jack Vernamonti¹, Robin Cotter², Jennifer Jubulis³, Kartikey Pandya⁴</td>
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<tr>
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<td>pediatric acute perforated appendicitis</td>
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<td>¹Maine Medical Center Department of General Surgery, Portland, ME,</td>
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<td>10:10</td>
<td>OR</td>
<td>Reduction of central line associated bloodstream infections and line</td>
<td>Jill Quirt¹, Christina Belza¹, Nikhil Pai², Rose-Francis Clause², Filip</td>
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<td></td>
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<td>occlusions in pediatric intestinal failure patients using KiteLock®, an</td>
<td>Markovic², Sylvia Wong-Sterling¹, Yaron Avitzur³, Paul W Wales¹</td>
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<td>alternate locking solution</td>
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<td>¹Division of General and Thoracic Surgery, The Hospital for Sick</td>
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<td>Children, Toronto, ON, Canada</td>
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<td>Hospital for Sick Children, Toronto, ON, Canada</td>
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<td>10:08</td>
<td>OR</td>
<td>Short-term international medical trips: local collaboration and its effects</td>
<td>Ameer Al-Hadidi¹, Hossam Alslaim²,³, Malik Ghawanmeh³, Farah Alfarajat⁴,</td>
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<td>on complications and patient satisfaction</td>
<td>Hani Habra⁴, Nathan Novotny⁵</td>
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<td>⁵Division of Pediatric Surgery, Department of Surgery, Beaumont Health,</td>
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<tr>
<td>61</td>
<td>O</td>
<td>10:16 - 10:23</td>
<td>The challenges of communicating with families about an urgent care paediatric surgical trial</td>
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<td>Nigel Hall¹, Frances Sherrat², Lucy Beasant³, Esther Crawley³, Bridget Young²</td>
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<td>¹University of Southampton, Southampton, United Kingdom</td>
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<td>³University of Bristol, Bristol, United Kingdom</td>
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<td>62</td>
<td>OR</td>
<td>10:24 - 10:31</td>
<td>30 years of flipping the coin - heads or tails?</td>
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<td>R. Michael Dorman, Charlene Dekonenko, Justin Sobrino, Jason Fraser, Tolulope Oyetunji, Shawn D St Peter</td>
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<td></td>
<td>Department of Surgery, Children’s Mercy Hospital, Kansas City, MO, United States</td>
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10:45 - 11:15  
Coffee Break

11:15 - 11:45  
CAPS Global Surgery Scholar  
Dr. Marisa Seepersaud, Guyana  
Introduction: Dr. Karen Bailey

11:45 - 12:45  
| Poster Session 2 - General/Hindgut/Global Surgery/Oncology/Technology  
<p>| Moderators: Dan Poenaru, Shant Sherkherdimian |
|---|---|---|---|
| 63 | P | 11:45 - 11:49 | Endoscopic third ventriculostomy versus vp shunt in cases of hydrocephalus in pediatric age group |
|    |    |              | Arvind Sinha, Rahul Saxena, Mahaveer Singh Rodha                                                    |
|    |    |              | All India Institute of Medical Sciences, Jodhpur, India                                              |
| 64 | PR | 11:50 - 11:54 | Single centre experience with balloon versus non-balloon gastrostomy tubes                          |
|    |    |              | Victoria Bentley, Natasha Martina Seemann, Christopher Blackmore                                     |
|    |    |              | Division of Pediatric and Thoracic Surgery, Dalhousie University, Halifax, NS, Canada               |
| 65 | PR | 11:55 - 11:59 | Diagnosis and management of neonatal ovarian cysts-a systematic review of the literature           |
|    |    |              | Robin Riley, James Murphy                                                                           |
|    |    |              | University of Vermont Medical Center, Burlington, VT, United States                                 |
| 66 | PR | 12:00 - 12:04 | Where’s Waldo’s scar? A covert approach to the umbilical hernia repair                              |
|    |    |              | Melanie I Morris, Faten Al-Robian                                                                    |
|    |    |              | University of Manitoba, Section of Pediatric Surgery, Department of Surgery, Faculty of Medicine, Winnipeg, MB, Canada |
| 67 | PR | 12:05 - 12:09 | Examining predictors of stool continence in a dedicated bowel management clinic at a tertiary referral center |
|    |    |              | Benjamin T Many, Yazan Rizeq, Allison Osborne, Taylor Sepuha,                                        |</p>
<table>
<thead>
<tr>
<th>Session</th>
<th>Type</th>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>68</td>
<td>PR</td>
<td>12:10 - 12:14</td>
<td>The impact of South African township environments on paediatric trauma</td>
<td>Vered Lack¹, Theshni Govender², Carlyle van Rensburg², Kewen van Rensburg², Jerome Loveland¹</td>
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<td>¹Chris Hani Baragwanath Academic Hospital, Department of Paediatric Surgery, Johannesburg, South Africa</td>
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<td>²Charlotte Maxeke Johannesburg Academic Hospital, Department of Paediatric Surgery, Parktown, Johannesburg, South Africa</td>
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<td>69</td>
<td>PR</td>
<td>12:15 - 12:19</td>
<td>Utility of pre-operative right upper quadrant ultrasound in sickle cell disease patients undergoing splenectomy</td>
<td>Mariatu A Verla¹, Gladstone E Airewele², Candace C Style¹, Hamsini Sriraman¹, Alicia Menchaca¹, Adam M Vogel¹, Oluyinka O Olutoye¹</td>
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<td>¹Division of Pediatric Surgery, Michael E DeBakey Department of Surgery and Department of Pediatrics, Section of Hematology-Oncology, Houston, TX, United States</td>
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<td>²Baylor College of Medicine, Texas Children’s Hospital, Houston, TX, United States</td>
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<td>70</td>
<td>PR</td>
<td>12:20 - 12:24</td>
<td>Sex differences in surgically correctable congenital anomalies: a systematic review</td>
<td>Anna Black, Daphne Lu, Leo Yefet, Robert Baird</td>
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<td>Division of Pediatric Surgery, Department of Surgery, Faculty of Medicine, University of British Columbia, Vancouver, BC Canada</td>
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<td>71</td>
<td>PR</td>
<td>12:25 - 12:29</td>
<td>Trends of surgical care in pediatric nephrectomies for malignancy</td>
<td>Jonathan Vacek, Yazan Rizeq, Benjamin Many, Monica Langer, Fizan Abdullah</td>
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<td>Division of Pediatric Surgery, Ann and Robert H. Lurie Children’s Hospital of Chicago, Chicago, IL, United States</td>
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<td>72</td>
<td>PR</td>
<td>12:30 - 12:34</td>
<td>Analgesic, anxiolytic and sedative use in critically ill medical and surgical children</td>
<td>Megan E Cunningham¹, Eric H Rosenfeld¹, Huirong Zhu², Michael D Chance², Sara C Fallon¹, Dustin M Hipp³, Sohail R Shah¹, Bindi Naik-Mathuria¹, David E Wesson¹, Nicholas A Ettinger³, Adam M Vogel¹</td>
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<td>¹Texas Children’s Hospital, Division of Pediatric Surgery, Houston, TX, United States</td>
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<td>²Texas Children’s Hospital, Department of Outcomes and Impact Services, Houston TX, United States</td>
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<td>³Texas Children’s Hospital, Department of Critical Care, Houston TX, United States</td>
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<td>12:45 - 13:00</td>
<td>Lunch box pick up</td>
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<td>13:00 - 14:30</td>
<td><strong>Pediatric Trauma: Difficult Case Conference and Lunch with Experts</strong>&lt;br&gt;Moderators: Andrea Winthrop, Steve Lopushinsky&lt;br&gt;&lt;br&gt;The Education Session will focus on pediatric trauma, and present challenging clinical cases for the audience to discuss, including diagnostic work up, case management dilemmas and treatment options. The audience will be invited to weigh in on the discussion to provide additional insights. Audience participation will be incorporated using the audience response system.&lt;br&gt;&lt;br<strong>Learning Objectives:</strong>&lt;br&gt;At the completion of this activity, participants will be able to:&lt;br&gt;1. Provide background and latest evidence for the clinical management of common paediatric trauma conditions with the focus on treatment options.&lt;br&gt;2. Understand the value and role of multi-disciplinary management and specialized care.&lt;br&gt;3. Manage cases similar to those presented, incorporating best evidence to guide practice and optimize patient outcomes.</td>
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<td>14:30 - 14:45</td>
<td>Refreshment Break</td>
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<td>14:45 – 16:00</td>
<td><strong>Scientific Session 6 Quality/Outcomes</strong>&lt;br&gt;Moderators: Melanie Morris, Hannah Piper&lt;br&gt;&lt;br</td>
<td>73</td>
<td>O</td>
<td>14:45 - 14:52</td>
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<td>14:53 - 15:00</td>
<td>Geographic distance to pediatric surgical care in Canada&lt;br&gt;Christian S McEvoy(^1,2), Dan Ross-Li(^3), Emily Norris(^1,2), Robert L Ricca(^1,4), Kenneth W Gow(^5)&lt;br&gt;(^1)Department of Surgery, Naval Medical Center Portsmouth, Portsmouth, VA, United States&lt;br&gt;(^2)Department of Health Analysis, Navy and Marine Corps Public Health Center, Portsmouth, VA, United States&lt;br&gt;(^3)Dig Data Science, Norfolk, VA, United States&lt;br&gt;(^4)Department of Pediatric Surgery, Naval Medical Center Portsmouth, Portsmouth, VA, United States&lt;br&gt;(^5)Departments of Surgery, University of Washington and Seattle Children’s Hospital, Seattle, WA, United States</td>
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<td>75</td>
<td>OR</td>
<td>Emergency surgical access in children: a prospective analysis to achieve improvements in outcome</td>
<td>Sonia Butterworth, Irena Zivkovic, Koroush Afshar, Simon Whyte, Manraj Heran</td>
<td>Department of Surgery, British Columbia Children’s Hospital, University of British Columbia, Vancouver, BC, Canada</td>
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</table>
| 76   | OR   | Towards standardizing congenital diaphragmatic hernia (CDH) care in Canada: assessing barriers to implementing national clinical practice guidelines | Kathryn LaRusso¹, Robert Baird², Richard Keijzer³, Erik Skarsgard², Pramod Puligandla¹                | ¹Division of Pediatric General and Thoracic Surgery, Montréal Children’s Hospital, McGill University Health Centre, QC, Canada  
²Division of Pediatric Surgery, British Columbia Children’s Hospital, University of British Columbia, Vancouver, BC, Canada  
³Division of Pediatric Surgery, Winnipeg Children’s Hospital, University of Manitoba, MB, Canada |
| 77   | OR   | The THYroid Nodules in Kids Study (ThyNK Study) an external audit of the American Thyroid Association (ATA) pediatric thyroid guidelines | Alghalya Al Maawali, Cyrus Matheson, Robert Baird, Geoffrey K Blair                                | Department of Surgery, British Columbia Children’s Hospital, University of British Columbia, Vancouver, BC, Canada |
| 78   | OR   | First national survey on opioids prescribing practices of Canadian pediatric surgeons | Elke Ruttenstock-Zani, Aubrey Sozer, Maeve O’Neil Trudeau, Annie Fecteau                           | Division of General and Thoracic Surgery, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada |
| 79   | O    | Operative management of urachal remnants: a NSQIP based study of post-operative complications | Paul Aylward, Kaeli Samson, Stephen Raynor, Robert Cusick                                          | University of Nebraska Medical Center, Omaha, NE, United States |
| 80   | OR   | Enhanced recovery after surgery (ERAS®) guideline for neonatal intestinal resection surgery: an international knowledge synthesis and consensus generation approach | Caraline McDiarmid¹, Kristin Short¹, Ali Macrobie¹, Jennifer YK Lam¹, Megan Brocket², Mehrul Raval³, Alexandra Howlett¹, Kyong-Soon Lee³, Martin Offringa⁴, Kenneth Wong⁵, David de Beer⁶, Tomas Wester⁷, Erik Skarsgard⁸, Paul Wales⁹, Annie Fecteau⁹, Beth Haliburton⁹, Gregg Nelson⁹, Mary E Brindle¹ | ¹Department of Surgery, Alberta Children's Hospital, Cumming School of Medicine, University of Calgary, AB, Canada  
²Department of Pediatric Anesthesia, University of Colorado, Denver, CO  
³Division of Pediatric Surgery, The Children's Hospital of Philadelphia, Pennsylvania, USA  
⁴Department of Surgery, Uppsala University Hospital, Uppsala, Sweden  
⁵Division of Pediatric Surgery, Stanford University School of Medicine, Stanford, CA, USA  
⁶UCLA Health, University of California, Los Angeles, CA, USA  
⁷Department of Surgery, University of Tartu, Tartu, Estonia  
⁸Division of Pediatric Surgery, The Children's Hospital at Montefiore, Bronx, NY, USA  
⁹Department of Surgery, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada |
CO, United States
2Department of Pediatric Surgery, Northwestern University, Chicago, IL, United States
3Department of Neonatology, Hospital for Sick Children, University of Toronto, Toronto, ON, Canada
4Department of Pediatric Surgery, Li Ka Shing, University of Hong Kong, Hong Kong, China
5Department of Pediatric Anesthesia, Great Ormond Street, London, United Kingdom
6Department of Pediatric Surgery, Karolinska University, Stockholm, Sweden
7Department of Pediatric Surgery, British Columbia Children’s Hospital, Vancouver, BC, Canada
8Department of Obstetrics and Gynecology, Cumming School of Medicine, University of Calgary, AB, Canada

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<thead>
<tr>
<th>81</th>
<th>OR</th>
<th>15:49 - 15:56</th>
<th>Implementing an early feeding pathway post-gastrostomy insertion reduces inpatient stay</th>
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<td>C Lam, K Dick, G Bethell, F Stedman, SC Keys, O Ron, L Kitteringham, MP Stanton, NJ Hall</td>
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<td></td>
<td>Department of Paediatric Surgery and Urology, Southampton Children’s Hospital, Southampton, United Kingdom</td>
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16:00 - 16:15 President’s Closing Remarks

18:30 - 24:00 President’s Banquet and Awards Ceremony
The development of multiorgan dysfunction in CDH-ECMO neonates is associated with the level of pre-ECMO support

Patrick T Delaplain\textsuperscript{1,2}, William Duong\textsuperscript{2}, Louis Ehwerhemuep\textsuperscript{a}a, Danh V Nguyen\textsuperscript{4}, Matteo Di Nardo\textsuperscript{5}, Tim Jancelewicz\textsuperscript{6}, William Feaster\textsuperscript{3}, Saeed U Awan\textsuperscript{2,7}, Peter T Yu\textsuperscript{2,7}, Yigit S Guner\textsuperscript{2,7}

\textsuperscript{1}Children’s Hospital Los Angeles, Department of Pediatric Surgery
\textsuperscript{2}University of California, Irvine Medical Center, Department of Surgery, Orange, CA, USA
\textsuperscript{3}Children’s Hospital of Orange County, Information Systems Department, Orange, CA, USA
\textsuperscript{4}University of California, Irvine School of Medicine, Department of Medicine, Orange, CA, USA
\textsuperscript{5}Neonatal Surgery Unit, Department of Medical and Surgical Neonatology, Ospedale Pediatrico Bambino Gesù, Rome, Italy
\textsuperscript{6}Le Bonheur Children’s Hospital, University of Tennessee Health Science Center, Division of Pediatric Surgery, Memphis, TN, USA
\textsuperscript{7}Children’s Hospital of Orange County, Division of Pediatric Surgery, Orange, CA, USA

**Purpose:** Congenital diaphragmatic hernia (CDH) is one of the most common indications for neonatal extracorporeal membrane oxygenation (ECMO), but mortality remains at 50%. Multi-organ failure can occur in a quarter of infants and has been linked to worse outcomes. We sought to examine the pre-ECMO factors that would increase the risk of multiorgan dysfunction (MOD).

**Methods:** The Extracorporeal Life Support Organization (ELSO) database was used to identify infants with CDH (2000-2015). The primary outcome was MOD, which was defined as the presence of organ failure in $\geq$ 2 organ systems. We used a nested, multivariable logistic regression to examine the effect of demographics, pre-ECMO blood gas/ventilator settings, comorbid conditions, and pre-ECMO therapies on the odds of MOD.

**Results:** There were a total of 4,374 CDH infants who were treated with ECMO; overall mortality was 52.4%. The risk models demonstrated that pre-ECMO cardiac arrest (OR 1.458, CI: 1.146–1.861, $p=0.002$) and hand-bagging (OR 1.461, CI: 1.094–1.963, $p=0.032$) had the strongest association with MOD. Other pre-ECMO indicators of disease severity (pH, HFOV, MAP, 5-minute APGAR) and pre-ECMO therapies (bicarb, neuromuscular [NM] blockers) were also associated with MOD (Table 1).

**Conclusion:** The level of pre-ECMO support has a significant association with the development of multi-organ failure on ECMO, perhaps suggesting that certain pre-ECMO therapies (e.g. NM blockers) should be used judiciously in ECMO candidates.

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<tr>
<th>Variable</th>
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<th>95% Confidence Interval</th>
<th>P-Value</th>
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<td>HandBagging</td>
<td>1.461</td>
<td>(1.094 - 1.963)</td>
<td>0.032</td>
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<td>Neuromuscular blockers</td>
<td>1.355</td>
<td>(1.176 - 1.561)</td>
<td>&lt;0.001</td>
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<td>Bicarbonate/THAM</td>
<td>1.179</td>
<td>(1.025 - 1.356)</td>
<td>0.021</td>
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<td>Prenatal CDH</td>
<td>1.194</td>
<td>(1.04 - 1.37)</td>
<td>0.012</td>
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<tr>
<td>Variable</td>
<td>Value</td>
<td>CI</td>
<td>p-value</td>
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<td>HFOV</td>
<td>1.170</td>
<td>(1.001 - 1.366)</td>
<td>0.051</td>
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<tr>
<td>MAP</td>
<td>1.030</td>
<td>(1.014 - 1.046)</td>
<td>0.002</td>
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<tr>
<td>Apgar at 5mins</td>
<td>0.949</td>
<td>(0.918 - 0.981)</td>
<td>0.002</td>
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<tr>
<td>pH</td>
<td>0.425</td>
<td>(0.225 - 0.801)</td>
<td>0.010</td>
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Senior Author: Yigit Guner  
Corresponding Author: Patrick Delaplain  
333 City Blvd West, Suite 1600  
Orange, California  92868  
United States  
Email: pdelapla@uci.edu
Nationwide analysis of mortality and hospital readmissions in esophageal atresia

Hallie Quiroz¹, Brent Willobee¹, Anthony Ferrantella¹, Joshua Parreco¹, David Lasko², Eduardo A Perez¹, Juan E Sola¹, Chad Thorson¹

¹University of Miami Miller School of Medicine, Miami, FL, USA
²South Florida Pediatric Surgeons, Plantation FL, USA

Purpose: The purpose of this study is to identify determinants of mortality and hospital readmission in infants born with esophageal atresia ± tracheoesophageal fistula.

Methods: The Nationwide Readmissions Database for 2010-2014 was queried for newborns with a diagnosis of esophageal atresia. Outcomes included mortality and readmissions at 30-day and 1-year.

Results: 3,157 patients were identified, 54% were male. 81% had an additional congenital anomaly while 35% had VACTERL association. Overall mortality at index hospitalization was 11% (n=360) and was significantly higher for infants with additional congenital anomalies (13%), VACTERL (19%), and Spitz classification II/III (18%) vs. isolated esophageal atresia/tracheoesophageal fistula (4%), all p<0.001. After esophageal atresia repair (n=2,179), 10% (n=212) were readmitted within 30 days and 26% (n=563) within 1 year, with 17% admitted to different hospitals. Common complications during readmission were GERD (54%), infections (42%), tracheomalacia (14%), and esophageal stricture (10%). Half underwent a major operative procedure during readmission, most commonly esophagoscopy + dilation (17%), esophageal operations (14%) and fundoplication/gastrostomy (12%). Additional outcomes are shown in the table.

Conclusion: Our study has uncovered a high likelihood of serious complications and readmission and within the first year of life for newborns with esophageal atresia. Coordinated, multi-disciplinary care may help to decrease unnecessary readmissions and improve outcomes in this vulnerable population.

Table 1. Effect of patient characteristics and index admission diagnoses on mortality and hospital readmissions.

<table>
<thead>
<tr>
<th>Index hospitalization characteristics</th>
<th>Index Admission-Mortality n = 360/3157 (11%)</th>
<th>Readmitted within 30 days n = 212/2180 (10%)</th>
<th>Readmitted within 1 year n = 562/2180 (26%)</th>
</tr>
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<tbody>
<tr>
<td>Charlson Comorbidity</td>
<td>Yes 28%*</td>
<td>39%†</td>
<td>54%†</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>No 11%</td>
<td>9%</td>
<td>26%</td>
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<tr>
<td>Index ≥ 1</td>
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<tr>
<td></td>
<td>Yes</td>
<td>19%†</td>
<td>10%*</td>
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<td>VACTERL</td>
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<td>Additional</td>
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<td>10%*</td>
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<td>4%</td>
<td>6%</td>
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<td>Major Cardiac Anomaly</td>
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<td>13%†</td>
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<tr>
<td>Isolated TEF</td>
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<td>5%</td>
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<td>Imperforate Anus</td>
<td>Yes</td>
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<td>60%†</td>
<td>21%†</td>
</tr>
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<td>No</td>
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<td>20%†</td>
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<td>Ostomy Creation</td>
<td>Yes</td>
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<td>24%†</td>
</tr>
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<tr>
<td>Spitz II + III</td>
<td>Yes</td>
<td>18%†</td>
<td>13%†</td>
</tr>
<tr>
<td>58% (1828)</td>
<td>No</td>
<td>2%</td>
<td>5%</td>
</tr>
</tbody>
</table>

* p<0.01, † p< 0.001. Extremely/Very Low birthweight = any birthweight <1500 grams
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The incidence of hearing loss in children diagnosed with congenital diaphragmatic hernia: a 24 year experience

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Purpose: The true incidence of hearing loss among children with congenital diaphragmatic hernia (CDH) is debated. Some studies indicate an incidence as high as 60%, particularly in ECMO patients, with a significant proportion of these patients presenting late at 2 to 5 years of age. Our aim is to estimate the incidence of developing hearing loss among children who underwent CDH repair.

Methods: We performed a retrospective cohort review of children younger than 10 years of age, who were treated for CDH in our province between 1991 and 2015. We used a surgical database that was linked to a provincial administrative research data repository. The case group consisted of children who were diagnosed with unspecified hearing loss (ICD-9-CM code 389). The control group was established using a 1:10 date-of-birth matched population. Using Fisher exact test, the odds ratio was calculated to determine the risk of having an association between the incidence of hearing loss and CDH. A p-value was considered to be significant if it was equal to or less than 0.05.

Results: The total sample size was 583 children. Of the control group (n=530), 27 (5.09%) children had hearing loss. While in the case group (n=53), 7 (13.31%) children were diagnosed with hearing loss. The odds ratio of developing hearing loss was 2.82 (CI 0.98 – 7.13), with a p value of 0.02668.

Conclusion: CDH is associated with a higher incidence of developing unspecified hearing loss. Its significance can be further evaluated in larger studies.

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The beneficial effect of amniotic fluid stem cell exosome administration in a novel in vitro model of pulmonary vascular remodeling

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Purpose: Pulmonary vascular remodeling secondary to congenital diaphragmatic hernia (CDH) is characterized by hyperproliferation of pulmonary arterial smooth muscle cells (PASMCs). We previously showed that administration of amniotic fluid stem cells exosomes (AFSC-exosomes) promotes lung maturation in experimental CDH. Herein, we aimed to: 1) establish an in vitro model of vascular remodeling, which has only been modeled in vivo via nitrofen administration to dams; 2) investigate whether AFSC-exosome administration has beneficial effects on this in vitro model of vascular remodeling.

Methods: In vitro model: we compared cell proliferation (EdU staining) following administration of nitrofen (55?M) or endothelin-1 (ET-1, 20?M, a potent vasoconstrictor dysregulated in human CDH) to rat PASMCs grown for 5 days. AFSC-exosomes experiments: exosomes were isolated from AFSC conditioned medium using ultracentrifugation. PASMCs were treated with medium alone or AFSC-exosomes for 24h. Uninjured PASMCs served as control. Groups were compared for proliferation rate using one-way ANOVA (Dunn's post-test).

Results: Compared to control, the proliferation rate of PASMCs was reduced by nitrofen and increased by ET-1 (Figure). Administration of AFSC-exosomes restored cell proliferation back to normal levels in both nitrofen injured and ET-1 stimulated PASMCs (Figure).

Conclusion: In vitro treatment of PASMCs with ET-1 reproduces a hyperproliferative state typical of vascular remodeling. AFSC-exosomes could be a therapeutic strategy for vascular remodeling in CDH babies.
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Accuracy of prenatal and postnatal imaging for management of congenital lung malformations
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\textsuperscript{2}Texas Children’s Hospital, Houston, TX, USA

\textbf{Purpose:} The purpose of this study was to assess the accuracy of prenatal and postnatal imaging modalities for evaluation and management of congenital lung malformations (CLMs).

\textbf{Methods:} A retrospective review was performed of all fetuses evaluated for a CLM between December 2001 and January 2018. Prenatal findings, operative treatment, and postnatal imaging and outcomes were collected. Patients were included if they had fetal imaging (US &/or fetal MRI), a postnatal chest CT, and surgical pathology. Data were analyzed using descriptive statistics, chi-square analysis, ROC curve analysis and Student’s t-test.

\textbf{Results:} We identified 157 patients with prenatal imaging that also had a postnatal chest CT at a median age of 2.1\[1.4, 3.2\] months. The majority were left sided lesions with a mean gestational age at prenatal diagnosis of 21.3±3.7 weeks and a median fetal CVR of 0.8[0.3, 1.7]. Of these, 75\%(n=117) had surgical resection. Using final pathology as gold standard, diagnostic accuracy (DA) for localization of unilobar lesions was 100\% for pre- and postnatal imaging, and 97\% vs 98\% for multilobar disease respectively. On comparison for identification of aberrant vasculature and pathology prediction, pre- and postnatal imaging DA were similar, however postnatal CT had the highest specificity for diagnosing lesions overall(p<0.05). Of the patients that did not undergo resection, seven patients were found to have no lesion on post-natal CT scan.

\textbf{Conclusion:} Prenatal imaging provides information for counseling and possible fetal intervention. This data suggests that postnatal CT scan provides important information for pre-operative counseling and surgical management.

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Long gap esophageal atresia: Inference of cervical esophagostomy on outcomes
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Purpose: Correction of long gap esophageal atresia (LGEA) require advanced technical skills and may represent a major challenge also in dedicated Centers. Cervical esophagostomy (CE) should be a first line treatment in cases of LGEA, waiting for esophageal substitution, or a rescue therapy after failed esophageal surgery. Our policy is to preserve native esophagus as much as possible, avoiding substitution. Aim of the present study was to evaluate our experience in treating LGEA according to the presence of CE

Methods: Retrospective review of a prospective collected database (January 2000-December 2018) was performed. LGEA was define as a preoperative GAP >3 vertebral bodies. Demographics, surgery features, post-operative complications, and 2-year outcomes were evaluated. Patients were grouped based on the presence of CE (Group A) or its absence (Group B)

Results: During the study period, 111 LGEA patients were treated, (32 with CE – Group A; 79 without CE – Group B). Patients with CE were more likely referred from other Centers after failed esophageal surgery. Table 1 summarized main results

Conclusion: Our data suggest that CE increase surgical and long-term complexity in LGEA infants: those patients with CE experienced increased rate of major postoperative leaks, re-do surgery, esophageal substitution, and vocal cord paralysis. Based on our results, CE should be utmost avoided, transferring complex LGEA patients in dedicated Centers

<table>
<thead>
<tr>
<th></th>
<th>Group A - 32 pts</th>
<th>Group B - 79 pts</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestation Age</td>
<td>37 (34-38)</td>
<td>37 (34-38,5)</td>
<td>1</td>
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<tr>
<td>Type A/B</td>
<td>15 (47)</td>
<td>42 (53)</td>
<td>0,7</td>
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<td>Age of “definitive” surgery</td>
<td>190 (150-336)</td>
<td>40 (3-90)</td>
<td>&lt;0,0001</td>
</tr>
<tr>
<td>Referral</td>
<td>29 (90)</td>
<td>18 (23)</td>
<td>&lt;0,0001</td>
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<tr>
<td>Esophageal substitution</td>
<td>3 (10)</td>
<td>-</td>
<td>0,02</td>
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<tr>
<td>Major leak</td>
<td>6 (19)</td>
<td>4 (5)</td>
<td>0,03</td>
</tr>
<tr>
<td>Re-do esophageal surgery</td>
<td>9 (28)</td>
<td>9 (11)</td>
<td>0,04</td>
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<td>Vocal cord paralyses (%)</td>
<td>13 (41)</td>
<td>3 (4)</td>
<td>&lt;0,0001</td>
</tr>
<tr>
<td>Deaths (%)</td>
<td>5 (16)</td>
<td>4 (5)</td>
<td>0,1</td>
</tr>
</tbody>
</table>
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MiR-200b knockout mice have vascular remodeling associated with pulmonary hypertension
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**Purpose:** Pulmonary hypertension (PH) results in heart failure and vascular remodeling in the lungs of congenital diaphragmatic hernia (CDH) babies. MicroRNA-200b (miR-200b) is an epigenetic factor linked to the pathogenesis of CDH. The aim of this study was to 1) evaluate the morphological vasculature changes in the lungs of miR-200b\textsuperscript{-/-} mice, and 2) to determine the role of miR-200b in PH by regulation of VEGF signaling pathway.

**Methods:** Changes in the cardiac function and size were assessed with echocardiography (n=6). We used micro-computed tomography to demonstrate the complexity of the pulmonary vasculature at the microlevel with high resolution, quantitative, three-dimensional images. Verhoeff-van Gieson (VVG) staining (n=4) was used to measure the medial and adventitial thickness of the lung vessels. VEGFR-1 expression was assessed using Western blotting and immunohistochemistry (IHC). Our experiments were reviewed and approved by the Animal Research Review Committee at the University of Manitoba. Protocol number: 18-046.

**Results:** Echocardiography revealed that miR-200b\textsuperscript{-/-} mice with PH have 14% increased cardiac output (p=0.0057) and shortened pulmonary acceleration time by 24% (p<0.0001). Also, right ventricular internal diameter significantly increased during systole (p=0.0383) and diastole (p=0.024). Morphometric assessment showed that miR-200b\textsuperscript{-/-} lungs have 35% increased arterial wall thickness, 47% medial wall thickness and 32% adventitial wall thickness in pulmonary vessels compared to normal lung (p<0.0001). IHC and western blot results showed that the overall expression of VEGFR1 was higher in miR-200b\textsuperscript{-/-} lungs.

**Conclusion:** Changes in vascular morphology in miR-200b mice are associated with PH. Our results suggest that miR-200b is involved in the alteration of the VEGF signaling pathway and thus can contribute to abnormal pulmonary vasculature development.

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The aryl hydrocarbon receptor (AHR) is involved in the pathogenesis of congenital diaphragmatic hernia (CDH)

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Purpose: Environmental chemicals may contribute to 70% of congenital diaphragmatic hernia (CDH) cases. A specific class of environmental chemicals can activate the transcription factor Aryl hydrocarbon receptor to induce gene expression. We hypothesize that activation of AHR by these chemicals is involved in the pathogenesis of CDH.

Methods: We assessed the response of AHR to nitrofen and known ligands; benzo[?]pyrene and resveratrol in the BEAS-2B human epithelial cell line (n=3). AHR activity within a 24 hour exposure period was assessed with immunocytochemistry (ICC/IF). We compared the abundance of AHR in saccular lung sections (n=3) from human CDH patients (Week 39-40) and the nitrofen treated rats (E21) to age-matched controls using immunofluorescence (IHC/IF). Ethical approval was obtained from the University of Manitoba: 19-010, HS15293.

Results: AHR activation was induced in BEAS-2B cells within six hours of treatment. We observed translocation of AHR as the signal from cytoplasm (inactive) to nucleus (active); suggesting nitrofen activates AHR. After 24 hours of treatment, the signal detected was strictly cytoplasmic and diminished. CDH patients and rat lung sections have increased AHR abundance in the mesenchyme and airways compared to controls.

Conclusion: We see similar changes in AHR abundance in both human CDH and nitrofen rat lungs; suggesting that similar pathological mechanisms are involved. This dysregulated expression of AHR may contribute to abnormal lung development in babies born with CDH. The results of the rat model implicate the involvement of AHR in human CDH cases; suggesting that environmental chemicals structurally similar to nitrofen may activate AHR to induce CDH.

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Improving the diagnostic accuracy of appendicitis using a multidisciplinary pathway
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³BC Children’s Hospital, Department of Radiology, Vancouver, BC, Canada

Purpose: Optimization of the timeliness and accuracy of the diagnosis of appendicitis represents an outcome improvement opportunity for children’s hospitals.

Purpose: The purpose of this study was to conduct a post-implementation audit of a diagnostic pathway for children with suspected appendicitis. This pathway utilizes a validated clinical stratification tool which combines history, physical and laboratory findings (Alvarado score) to stratify patients into low, intermediate and high risk of appendicitis groups. Low risk patients are discharged, high risk patients are referred to surgery while intermediate risk patients have ultrasound examinations.

Methods: A 10% convenience sample was analyzed. Outcome measures included diagnosis, false positives (negative appendectomies), false negatives, and return ED visits.

Results: 134 patients were stratified into low (n=39), intermediate (n=81) and high (n=14) risk groups. 22 patients (16%) had appendicitis, of which 6 (27%) were perforated. The negative predictive value in the low risk group was 97%, while the positive predictive value in the high risk group was 50%. The positive ultrasound rate in the intermediate risk group was 17%. Ultrasound utilization in high risk patients was unexpectedly 78%: half were requested by surgeons, while the other half were the result of inappropriate risk assignment (scoring prior to availability of laboratory results). The negative appendectomy rate was 4.4%, (the pre-pathway rate was 12%). 8 low risk patients returned to the ED, of which 1(0.8%) had appendicitis.

Conclusion: Implementation of a standardized diagnostic pathway reduced the negative appendectomy rate to 1/3 its pre-pathway value. The post-implementation audit identified additional pathway improvement opportunities.

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Pediatric blunt cerebrovascular injuries: a national trauma database study
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Purpose: Blunt cerebrovascular injuries (BCVIs) are rare but have potentially devastating consequences. In adult blunt trauma patients the incidence is 3%, but the rate in children is unknown. Our aim was to determine the rate and consequences of BCVIs in pediatric blunt trauma patients based on national registry data.

Methods: We queried the National Trauma Data Bank (NTDB) for all pediatric blunt trauma patients between 2007 and 2014. BCVI patients were identified by ICD-9 codes (900.00-03, 900.89, 443.21). Demographic, emergency room, and concomitant injury data were analyzed.

Results: There were 1682 BCVIs identified in 732,702 blunt trauma patients (0.23%): 725 (43%) carotid artery injuries (CAIs); 891 (57%) vertebral artery injuries (VAIs); 4% sustained both a CAI and a VAI. CAIs and VAIs occurred more commonly in males (62.1% and 67.3%, p=0.04). The majority occurred in white patients (61%) and occurred in motor vehicle accidents (53%). The average age was 12.1±5.4 years. CAI patients had a higher rate of skull base fractures (55% vs 35%, p<0.0001) and lower Glasgow Coma Scale (8.2 vs 11.0, p<0.0001); cervical spine fractures were more common with VAIs (26% vs 11%, p<0.0001). Intensive care and overall stay were longer in the CAI patients (9.2 vs 7.9 days, p=0.03; 12.5 vs 9.7 days, p=0.0002). 5% of CAI patients had a diagnostic code for stroke, versus 2% of VAIs (p=0.002).

Conclusion: BCVIs are rare in children, with vertebral injuries being more common than carotid injuries. Carotid injuries tended to be associated with a longer length of stay and higher stroke rates.

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11
Do pedestrian countdown signals reduce pedestrian-motor vehicle collisions or pedestrian injury severity? A before-after study
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²University of Ottawa, Ottawa, ON, Canada
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Purpose: Purpose: Pedestrian countdown timers (CDT) are a relatively cost-effective and simple intervention targeted at reducing road traffic injuries. The aim of this study was to compare rates of pedestrian-motor vehicle collision and the severity of resulting injuries before and after installation of CDT.

Methods: Methods: CDT installation was matched with our Trauma Registry and the CIHI Emergency National Ambulatory Care Reporting System database. Rates of collisions pre- and post-CDT installation were compared at intersections that had CDT installed during this time period. Each intersection served as its own control. Confounding factors such as weather and road conditions were adjusted for in the model.

Results: Results: The analysis included 910 individuals in collisions (207 individuals < 18 years old; 703 individuals > 19 years old). Of these, 660 were pre-CDT installation, and 250 were post-CDT installation. Pre-CDT installation injury severity was minor in 89.8% and major in 10.2%. Post-CDT installation injury severity was minor in 89.2% and major in 10.8%.

Collision rates did not differ pre and post CDT installation. Analysis of those < 18 years old also did not show any differences overall, however a sub analysis revealed a statistically significant decrease in collisions in children 10-14 years old (IRR 0.52, 95% CI 0.28 to 0.99; p = 0.05).

Conclusion: Conclusions: While there was a decrease for individuals 10-14 years old, overall rates of collisions pre and post-CDT installation did not differ. Alternative interventions may be explored.

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Melanocytic malignancies in children: analysis from a national cancer database
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Purpose: Melanomas are rare in children, and therefore seldom considered during evaluation of pigmented skin lesions. However, the risk of missing a true malignancy carries devastating consequences. The purpose of this report is to better understand the presentation and management of these lesions.

Methods: The National Cancer Database (NCDB) was searched for melanocytic tumors from 2004-2015. Patients less than 18 years of age were selected as the primary cohort. Variables regarding age, location, tumor details, stage when available, treatment, and outcomes were collected and analyzed.

Results: A total of 1779 cases met selection criteria, with a stable incidence over the years. Almost half (48%) were less than 15 years age, and 206 were <5 years. The most common site was the trunk and extremities (73.5%), followed by the head and neck areas (24.1%). The highest frequency lesion was a melanoma (90.7%), with 80 Spitzoid lesions. A majority of the melanoma cases were ‘invasive’ (88.9%), while nodal status was positive in 23.4% cases. Negative margins at surgery were reported in 91.5% of patients. Only 40 underwent adjuvant radiation, and 63 chemotherapy – reflecting the surgical nature of treatment. Prognosis was excellent with 95% 5-year survival, and 89% 10-year survival estimated.

Conclusion: Melanocytic cancers in children are rare and can occur in very young patients. Prognosis is excellent in most cases, emphasizing the importance of early treatment. A high index of suspicion is necessary when assessing pigmented lesions in children. Further analysis is needed to assess the impact of tumor size and histology.

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Human and economic costs of pediatric firearm injury
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Purpose: Pediatric firearm injury is a national crisis that inflicts significant trauma. No studies have captured risk factors for readmissions after firearm injury and its associated cost for this population.

Methods: Nationwide Readmissions Database (2010-2014) was queried for patients <18 years admitted after acute firearm injury. Outcomes included mortality, length of stay, hospital costs, and readmission rates (30-day and 1-year) to index and different hospitals. Multivariable logistic regression identified risk factors, significance set at p<0.05

Results: 13,596 children were admitted for firearm injury. Mortality rate was 6% (n=797). Self-inflicted injury was the most lethal (37%, n=218) followed by unintentional (5%, n=186), and assault (4%, n=340), all p<0.01. Readmission rates at 30 days and 1-year were 6% (12% to different hospital) and 12% (19% to different hospital), respectively. Multivariate results are in the table. Patients with public insurance (Medicaid/Medicare) were more frequently readmitted to the index hospital, whereas those with high income and self-pay were readmitted to a different hospital. Annually, hospitalizations cost over $95 million, with $1.4 million due to readmission to a different hospital.

Conclusion: While guns cause significant morbidity, disability, and premature mortality in children, they also have a substantial economic impact. This study quantitates the previously unreported national hidden burden of readmission costs and discontinuity of care for this preventable public health crisis.

<table>
<thead>
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<th>Characteristic</th>
<th>Mortality OR [95% CI]</th>
<th>30 Day Readmission OR [95% CI]</th>
<th>1 Year Readmission OR [95% CI]</th>
<th>Readmission, Different Hospital OR [95% CI]</th>
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<tbody>
<tr>
<td><strong>Manner/Intent</strong></td>
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<tr>
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<td>9.3 [7.19-11.96] †</td>
<td>3.1 [2.19-4.37] †</td>
<td>2.9 [2.21-3.73] †</td>
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<tr>
<td>Unintentional</td>
<td>1.4 [1.13-1.73] †</td>
<td>1.6 [1.31-1.86] †</td>
<td>1.3 [1.18-1.52] †</td>
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<tr>
<td>ISS &gt;15</td>
<td>17.3 [13.68-21.79] †</td>
<td>2.0 [1.73-2.35] †</td>
<td>1.9 [1.73-2.18] †</td>
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<td>0.2 [0.17-0.25] †</td>
<td>2.0 [1.62-2.37] †</td>
<td>2.0 [1.71-2.24] †</td>
<td>0.3 [0.22-0.41] †</td>
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<td>1.3 [1.03-1.51] †</td>
<td>1.3 [1.15-1.52] †</td>
<td>0.7 [0.49-0.98] †</td>
</tr>
</tbody>
</table>
Table 1: Multivariate Predictors of Mortality and Readmission. OR=Odds Ratio; CI=Confidence Interval; LOS = Length of Stay; *p< 0.05; †p <0.01

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The unborn fetus: the unrecognized victim of trauma during pregnancy

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Purpose: Trauma is the leading cause of non-obstetric death in pregnant females. While maternal management is defined, few studies have examined the effects on the fetus.

Methods: Following IRB approval, all pregnant females from 2010-2017 at a level-1 trauma center were retrospectively reviewed. Maternal and fetal demographics, interventions and clinical outcomes were analyzed.

Results: There were 188 pregnancies in 5,654 females. Maternal demographics were 27±7 years, gestational age at trauma 23±11 weeks, 81% blunt mechanism, and maternal mortality 6%. Thirty-nine (21%) fetuses were immediately affected by the trauma including 20 (11%) born alive, 12 (7%) fetal demise, and 7 (4%) stillbirths. Of those that initially survived (n=20), 5 (25%) expired during neonatal hospitalization. Two mothers returned immediately after trauma discharge with stillbirths for an overall infant mortality of 14% (n=26). There were 84 patients with complete data to delivery including the 41 born at the time of trauma and 43 born on a subsequent hospitalization. Those born at the time of trauma had significantly more delivery/neonatal complications and worse outcomes (Table 1). Overall trauma burden to the fetus (preterm delivery, stillbirth, delivery/neonatal complication, or long-term disability) was 66% (56/84).

Conclusion: Trauma during pregnancy has significant immediate mortality and delayed effects on the unborn fetus. This study has uncovered a previously hidden burden and mortality of trauma during pregnancy.

Table 1: Comparisons Between Neonates Born Alive Immediately Due to Maternal Trauma vs. Those Born on Subsequent Admission

<table>
<thead>
<tr>
<th></th>
<th>Subsequent Admission n=43</th>
<th>Born Alive at Maternal Trauma Admission n=20</th>
<th>p=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergent Caesarian</td>
<td>5 (12%)</td>
<td>16 (80%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Delivery Complication</td>
<td>12 (28%)</td>
<td>13 (65%)</td>
<td>0.005</td>
</tr>
<tr>
<td>Placental Abruption</td>
<td>1 (2%)</td>
<td>8 (40%)</td>
<td>0.008</td>
</tr>
<tr>
<td>Birth Weight (BW)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BW (&lt;1500gm)</td>
<td>3280±432 gm</td>
<td>2072±894 gm</td>
<td>All p&lt;0.001</td>
</tr>
<tr>
<td>Very Low BW (&lt;1000gm)</td>
<td>2 (5%)</td>
<td>13 (65%)</td>
<td></td>
</tr>
<tr>
<td>Low BW (&lt;1000gm)</td>
<td>0</td>
<td>5 (25%)</td>
<td></td>
</tr>
<tr>
<td>Gestational Age at Birth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premature (&lt;37 weeks)</td>
<td>39±2 weeks</td>
<td>34±5 weeks</td>
<td>Both p&lt;0.001</td>
</tr>
<tr>
<td>Neopatral Complication</td>
<td>6 (14%)</td>
<td>13 (65%)</td>
<td></td>
</tr>
<tr>
<td>NICU Admission</td>
<td>16 (37%)</td>
<td>14 (70%)</td>
<td>0.015</td>
</tr>
<tr>
<td>Hospital LOS</td>
<td>19 (44%)</td>
<td>16 (80%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mortality</td>
<td>3 [2-4] days</td>
<td>6 [3-30] days</td>
<td>0.015</td>
</tr>
<tr>
<td>Mortality</td>
<td>0</td>
<td>5 (25%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Data presented as mean ± SD, median [IQR], or n(%) as appropriate. aDue to abruption, non-reassuring fetal heart tones, maternal distress; bDecelerations, asphyxia, abruption; cNeonatal medical or surgical complication (IVH, NEC, HIE, respirator, etc)

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A first provincial analysis of Québec’s bicycle helmet use and its impact on traumatic brain injury and hospital admission risks in children

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Purposes: Québec is only one of two Canadian provinces without legislation mandating helmet use for children/adolescent bicyclists. To effect policy change, we characterized helmet usage across Québec and its impact on traumatic brain injury (TBI) and hospital admission.

Methods: With REB approval, bicycle-related injury data from two provincial databases (Canadian Hospitals Injury Reporting and Prevention Program and the Registre des Traumatismes du Québec) involving emergency department visits at 4 pediatric centres in Québec between 2007-2018 was evaluated. Demographics, helmet usage, TBI incidence and hospital admission status were collected. Odds ratios were estimated using logistic regression with helmet use, admissions, or TBI as outcomes measures.

Results: Of 8968 patients studied, helmet usage data was available for 6075 (68%), with 3038 (50%) reporting wearing a helmet. Proportion of TBI and admission for the entire cohort were 14% and 7%, respectively. On subgroup analysis, helmet usage was lowest among 14-17y (41% n=569/1378) and was not influenced by gender across all ages (OR 1.0; 95%CI 0.90-1.12). Helmeted children were less likely to incur TBI (OR 0.53; 95%CI 0.46-0.62) or admission (OR 0.70; 95%CI 0.56-0.87). Independent predictors for TBI included no helmet (OR 1.87; 95%CI 1.62-2.16) and males (OR 1.26; 95%CI 1.08-1.48); those for hospital admission included no helmet (OR 1.44; 95%CI 1.15-1.79), males (OR 1.66; 95%CI 1.29-2.17) and 14-17y age-group (OR 1.56; 95%CI 1.19-2.05).
Conclusion: This first study using Québec provincial data outlines the significant risk of TBI and hospital admission for non-helmeted children/adolescents. This data should help initiate provincial policy changes and counselling/education efforts for highest-risk populations.

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Drug repurposing targeting Pannexin1 to treat rhabdomyosarcoma

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**Purpose:** Rhabdomyosarcoma (RMS) is an aggressive soft tissue sarcoma of childhood for which novel therapeutic strategies are urgently needed. We have recently found that pannexin1 (PANX1) is down-regulated in RMS and that increasing its levels inhibits RMS progression in vitro and in vivo. Here our goal is to use information attained from our genome-wide transcriptome profiling of murine cells treated with over 200 clinically approved drugs to identify drugs that increase PANX1 levels in RMS, and evaluate the ability of these PANX1-upregulating drugs to inhibit RMS progression.

**Methods:** Based on our transcriptome profiling, 11 drugs increased PANX1 transcript levels (Z-score > ~2). RMS patient-derived cell lines were treated with these candidate drugs and PANX1 levels were examined. PANX1-upregulating drugs were assessed for their ability to inhibit RMS tumour growth and to induce RMS regression in vitro. Statistical significance was analyzed using two-tailed Student’s t-test (n\textsuperscript{3}; *p<0.05).

**Results:** Of the 11 drugs, PANX1 levels are significantly increased by quercetin in RMS in a dose-dependent manner. Importantly, quercetin treatment inhibited RMS tumour growth, and induced complete regression of established RMS tumours in a dose-dependent manner.

**Conclusion:** We found that quercetin treatment increases PANX1 levels in RMS, inhibits RMS growth, and induces RMS regression in vitro. Future preclinical experiments in mice will determine the potential benefit of quercetin treatment for RMS patients. Our studies testing the efficacy of quercetin and other clinic-ready drugs for their repurposing towards a novel RMS therapy could significantly accelerate their application in the treatment of RMS patients.

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Acquired tracheo-esophageal fistula in children: our clinical experience in diagnosis and management

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Purpose: To discuss various clinical presentations, diagnosis, and management of acquired TEF in children admitted to our institute in the last 3 years.

Methods: Between 2015-2018, four patients with acquired TEF were admitted in our institute. We discuss the clinical presentation and the management of these cases.

Results: Four cases (three girls and one boy) with a median age of 59 months (range-9-204 months) were included. The presenting symptoms were recurrent coughing on taking feeds (n = 2), persistent vomiting (n=2) and feeding difficulty (n=1). The aetiologies were disc battery ingestion (n = 2), Organophosphorus ingestion and tracheostomy (n = 1) and postoperative complication of Bronchogenic cyst excision(n=1).

Initial management included NG feeds(n=2), Feeding Gastrostomy(n=1) and Feeding Jejunostomy(n=1). Bronchoscopic TEF obliteration was attempted in one patient with fibrin glue but it was not successful.

Diagnosis of TEF was made using the combination of UGI Study, esophagoscopy and CECT. The patients were variously managed: primary repair of TEF (n=3), 2 by the cervical approach and 1 by thoracotomy and 1 retrosternal Gastric pull-up.

Conclusion: Acquired TEF is rare in the pediatric population with diverse etiology and clinical presentations. We discuss the management algorithm and the rationale that we utilized in the management of these cases. We also discuss the challenges that we faced and the routes we took to overcome the same. The study of these cases could provide coherence to the diverse approaches that may be possible in such difficult cases.

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Post-operative pain control following minimally invasive repair of pectus excavatum in pediatric patients: a systematic review

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Purpose: Surgery for the correction of pectus excavatum is associated with significant post-operative pain, yet no consensus exists on most effective method of pain control. The aim of this study was to summarize the current literature regarding post-operative pain control for pediatric patients undergoing minimally invasive repair of pectus excavatum (MIRPE).

Methods: Systematic search of MEDLINE, Embase, PubMed, CINAHL, Web of Science, and the Cochrane Library for randomized controlled trials (RCT) comparing methods of post-operative pain control in pediatric patients undergoing MIRPE. Studies were restricted to the English language. Outcomes included post-operative pain scale scores, opioid administration, and analgesic complications.

Results: 2361 references were identified. After full screening, 9 RCTs enrolling 485 patients were included, with an average age of 11.9 (±3.1). Pain scores decreased with the use of ketamine-based infusions via patient-controlled anesthesia pump (PCA) (1/2 studies that assessed it) and intercostal and paravertebral nerve blocks (3/3) compared to opioid-based PCA. Scores also decreased with ropivacaine as opposed to bupivacaine-based epidurals (1/1). Opioid consumption decreased with ketamine-based infusions (2/2) and intercostal and paravertebral nerve blocks (3/3). Nausea decreased with ketamine-based infusions (1/2) and intercostal and paravertebral nerve blocks (1/3). Epidural use did not decrease any of the outcomes of interest compared to PCA. Length of stay was not impacted by pain control modality.

Conclusion: A paucity of data and study design variability made drawing firm conclusions difficult. Ketamine-based infusions or paravertebral and intercostal nerve blocks may represent superior methods of post-operative analgesia when compared to patient-controlled analgesia, Further work is needed to confirm results.

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Magnamosis for esophageal atresia is associated with an increased number of dilatations

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**Purpose:** Magnamosis is a novel technique which utilizes high power magnets to anastomose the esophageal ends in children with esophageal atresia (EA), theoretically avoiding the need for thoracotomy. The objective of this study was to determine if magnamosis results in more post-operative dilatations.

**Methods:** Our center has treated three cases of EA with magnamosis; one was unsuccessful, is awaiting esophageal replacement, and therefore, excluded from this study. The number of dilatations performed after magnamosis was compared to controls from our clinical database, which includes all children born with EA between 1991 and 2015. The control group had EA with or without tracheoesophageal fistula treated with primary pouch-to-end anastomosis or colonic interposition (\(n = 65\)). Mann-Whitney tests were used to compare the number of dilatations between each group, with \(p < 0.05\) being significant.

**Results:** The two children who were managed with magnamosis had a significantly greater number of dilatations compared to the control group (\(n=65\), \(p=0.022\)), as well as compared to those managed with pouch-to-end anastomosis (\(n=57\), \(p=0.021\)). The number of dilatations was not significantly greater when compared to those managed with colonic interposition (\(n=8\), \(p=0.106\)).

**Conclusion:** Our results indicate that magnamosis is associated with more post-intervention dilatations compared to conventional anastomotic means, suggesting that magnamosis results in more frequent or more resilient anastomotic strictures.

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Effect of body position on three-dimensional scanning technique for assessment of pectus carinatum

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Purpose: Pectus carinatum (PC) is characterized as a protrusion formed on the thorax. PC severity and correction is currently assessed using calipers to measure anteroposterior (AP) and mediolateral (ML) thorax dimensions. However, calipers have low precision and require accurate alignment to obtain reliable data. A three-dimensional (3D) scanning technique may overcome these limitations. The influence of patient positioning on the protrusion geometry and corresponding AP/ML measures is unknown. The study purpose was to determine the influence of patient positioning on the reliability of the 3D scanning technique and AP/ML measures.

Methods: Eight male participants (n=8, ages 12-19 years) who met the inclusion criteria (symmetrical PC, no connective tissue disorders) were recruited (Ethics: REB17-0238). Standing 3D scans for each participant were obtained in a treatment room for two positions: hands on the hips and above the head. Five scans were collected by a single rater for each position. AP/ML measurements were calculated at the protrusion apex on the torso using custom software. Intraclass correlations (ICCs) were determined for each position to assess intra-rater reliability. Changes in AP/ML measures with position (?=0.05) were determined with a linear-mixed-model.

Results: ICCs for AP/ML measures in both positions were high (0.92-0.98). Hand position had a significant effect on AP (5mm, p<0.01) magnitudes. ML magnitudes were not affected by position.

Conclusion: The 3D scanning technique shows promise in providing AP/ML thorax measurements that are more reliable than calipers. Consistent patient positioning is required to ensure reliable determination of PC correction during treatment. Inter-rater reliability will be investigated in future studies.

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Impact of surgical repair on cardiac function in newborn infants with high-risk congenital diaphragmatic hernia

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Purpose: Congenital diaphragmatic hernia (CDH) is often associated with transient cardiorespiratory instability in the immediate postoperative period. Little is known on the impact of surgical repair on cardiac function. The aim of this study is to investigate cardiac function pre and post-surgery in high-risk CDH newborn infants.

Methods: This is a retrospective study. All CDH newborn infants with cardiac function assessed immediately before surgery (T1), at 48 hours (T2) and two weeks (T3) from repair were included. Left (LV) and right (RV) ventricle systolic and diastolic function were evaluated with tissue Doppler (TDI: S’ and E’, respectively) and apical 4-chamber longitudinal strain (LS).

Results: 10 newborn infants, of which 7 defect type B, 2C, 1D. Surgical repair was performed at 4.1+/−2.7 days of life. RV systolic (RV S’, RV LS) and diastolic (RV E’) function significantly increased at T2 and T3 compared to T1. A significant decrease in LV diastolic function (LV E’) was observed at T2 compared to T1 which then improved at T3 (table 1). LV systolic function didn’t show significant changes.

Conclusion: Surgical repair in high-risk CDH newborn infants is associated with RV function improvement and a transient LV diastolic worsening. These changes may contribute to transitory hemodynamic instability. Future studies are needed to confirm these findings and the mechanisms underlying them.

Table 1: Left and right ventricle systolic and diastolic function in high-risk CDH newborn infants

<table>
<thead>
<tr>
<th></th>
<th>Pre-op (T1)</th>
<th>Post-op (T2)</th>
<th>2 weeks post op (T3)</th>
<th>P (T1 vs T2)</th>
<th>P (T1 vs T3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Longitudinal strain (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LV LS</td>
<td>-15.9 (5.1)</td>
<td>-16.8 (4.0)</td>
<td>-16.3 (4.0)</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>RV LS</td>
<td>-10.9 (4.4)</td>
<td>-12.5 (2.3)</td>
<td>-15.3 (4.7)</td>
<td>0.5</td>
<td><strong>0.006</strong></td>
</tr>
<tr>
<td><strong>Tissue Doppler velocities (cm/s)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDI RV S’</td>
<td>3.2 (0.4)</td>
<td>4.1 (0.7)</td>
<td>6.1 (1.1)</td>
<td><strong>0.04</strong></td>
<td>0.02</td>
</tr>
<tr>
<td>TDI RV E’</td>
<td>2.8 (0.4)</td>
<td>3.3 (0.9)</td>
<td>5.8 (1.1)</td>
<td>0.1</td>
<td><strong>0.004</strong></td>
</tr>
<tr>
<td>TDI LV S’</td>
<td>3.2 (0.7)</td>
<td>3.3 (0.8)</td>
<td>4.2 (0.7)</td>
<td>0.8</td>
<td>0.1</td>
</tr>
<tr>
<td>TDI LV E’</td>
<td>3.2 (0.5)</td>
<td>2.8 (0.6)</td>
<td>4.3 (0.7)</td>
<td><strong>0.03</strong></td>
<td><strong>0.01</strong></td>
</tr>
</tbody>
</table>

LS: 4-chamber longitudinal strain; LV: left ventricle; RV: right ventricle; TDI: tissue Doppler (S’ systolic function, E’ diastolic function).

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Assisted reproductive technology is not associated with giving birth to a baby with congenital diaphragmatic hernia

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Purpose: Several studies have reported that babies born by assisted reproductive technologies (ART) are at an increased risk of developing a congenital anomaly. The purpose of this study was to determine if assisted reproductive technology is associated with the development of congenital diaphragmatic hernia (CDH).

Methods: We performed a case-control study on mothers who gave birth to a child with Bochdalek-type CDH between 1991 and 2015. The case cohort was determined from the Winnipeg Surgical Database of Outcomes and Management (WiSDOM) and a 10:1 date-of-birth matched control population was established using the Manitoba Centre For Health Policy (MCHP) data repository. We compared the use of ART, artificial insemination, and fertility medication use in the mothers of cases versus controls.

Results: We found no significant difference between mothers of cases and mothers of controls who used ART (OR=1.44[0.16-6.42], p=0.65) and artificial insemination (OR=10.04[0.13-787.59, p=0.17). Additionally, no significant difference was found between mothers of cases and mothers of controls who received infertility medications (OR=1[0.11-4.23], p=1).

Conclusions: Use of ART, artificial insemination, and fertility medications was not found to be higher in mothers of children with CDH versus date-of-birth matched controls.

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Is the physical activity of healthy children a valid baseline for the preoperative physical activity of children undergoing elective surgery?

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**Purpose:** Establishing baseline physical activity (PA) in children undergoing surgery is necessary to measure their recovery; yet not feasible in emergent patients with unplanned admission. To determine if the PA of healthy controls (HC) could serve as a valid baseline for surgical patients (SP), comparison was made between the preoperative PA of SP undergoing an elective operation and those of HC.

**Methods:** SP wore an accelerometer device (Actigraph GT3X) for at least 2 days prior to surgery. SP were compared to two groups: HC recruited from the community, and participants from the National Health and Nutrition Examination Survey (NHANES). HC wore the device for 2 days, and NHANES participants for 7 days. SP were matched by sex, age, and body mass index to HC and NHANES participants. PA was categorized as light (LPA) or moderate/vigorous (MVPA). Mean PA levels were compared.

**Results:** 30 SP (50% female, ages 3-18, 20% obese) were matched with 80 HC and 3,147 NHANES participants. Accelerometer wear time between HC and SP was similar and averaged 19 hours/day ($p = 0.87$). HC averaged 125 min (SD=43) MVPA per day while SP averaged 69 min/day (SD = 27) ($p<0.01$). SP and HC averaged 18 minutes and 67 min/day higher MVPA than the matched NHANES sample, respectively ($p<0.01$).

**Conclusion:** The PA data of neither the HC nor the NHANES participants were comparable to those of SP. Further investigation is warranted to establish a baseline PA level in children undergoing surgery.

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Quantifying the association between inpatient ambulation and recovery for postoperative pectus patients
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Purpose: Patients with pectus excavatum (PE) undergoing a modified Nuss procedure have limited ambulation after surgery due to the severity of pain. Return of ambulation is an important indicator of postoperative recovery, yet assessment of this measure remains largely subjective. Our aim is to objectively quantify ambulation and recovery in this population.

Methods: Patients ages 13 to 22 years old undergoing PE repair wore an accelerometer (Actigraph GT3x) postoperatively during their hospital stay. Ambulation was measured as step counts (SC) and analyzed with a linear regression. Patient-reported pain scores (PRPS) and analgesic administration (AA) were collected from the electronic medical records. Daily PRPS and AA were used in a multivariate analysis to examine any association with SC.

Results: Ten patients (30% female, average age of 15.7 years, 70% non-Hispanic white) were recruited. All patients received a patient controlled analgesic pump. By postoperative day 4, there was a significant drop in AA from 5.6 to 2.2. A total of 743 hours of accelerometer wear-time was observed between all patients with an average length of stay of 4 days. Analysis showed daily SC increased 689 steps each day (P-value <0.001). Regression analyses of ambulation demonstrated no significant association with either PRPS (P-value 0.845) or AA (P-value 0.302).

Conclusion: PRPS and AA were not found to be a significant determinants of ambulation; however, PE patients tend to exhibit similar recovery trajectories after surgery. Objectively measuring ambulation can provide feedback on the status of recovery, which is an important benchmark for discharge. Senior Author: Fizan Abdullah
Comparison between laparoscopic versus open surgical repair of congenital Morgagni hernia: a single center study

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Purpose: The Aim of this study was to compare the clinical and surgical outcomes between laparoscopic and open surgical repair of congenital Morgagni hernia (CMH) patients.

Methods: A retrospective chart review of the medical records of all children who underwent CMH surgical repair during the period between July 2003 and July 2015. The charts were reviewed for basic characteristics, duration of procedure, length of hospital stay, start of enteral feed, length of follow up and recurrence.

Results: A total of 44 patients had CMH surgical repair. There was male predominance in the patient’s population 36 (81.8%). The mean (M) age at the time for the surgical intervention was 20 months. Surgical repair methods of CMH were open 18 (41%) and laparoscopic 26 (59%). Operative time was shorter in the open surgical repair compared with the laparoscopic surgical repair (M= 86 vs M= 124 minutes respectively, P=0.001). Length of hospital stay was shorter with laparoscopic approach compared with the open approach (M= 7 vs M= 9.9 minutes respectively, P=0.006). Enteral feeding initiated earlier in patients that underwent laparoscopic procedure (M=1.9 days, P=0.01). There was one recurrence documented in a patient that underwent a laparoscopic repair of CMH.

Conclusion: Morgagni hernia repair is an elective procedure that is carried out by pediatric surgeons worldwide. The laparoscopic approach has advantages over the open repair in term of shorter hospital stay and earlier start of enteral feed. The recurrence rate of CMH is low with both the laparoscopic and open surgical repair.

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Congenital diaphragmatic hernia: prevalence and risk factors across the world
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Purpose: To determine the CDH global prevalence and identify CDH-related risk factors.

Methods: Using a defined strategy, a systematic review of the literature was conducted (Pubmed, Scopus, Cochrane), searching for population-based epidemiological studies reporting the prevalence of CDH per country. Studies containing overlapping populations or timeframes were excluded. CDH-related risk factors were calculated by meta-analysis using RevMan5.3 and expressed as odds ratio and 95% confidence interval. This study was conducted according to PRISMA guidelines and registered on PROSPERO.

Results: Prevalence: Of 14,080 abstracts screened, 28 full-text articles were included. These studies were published between 1967 and 2018 and included 25 countries (Figure). The overall prevalence of CDH was 2.46 (range: 0.08-5.65) in 10,000 births (18,543 CDH babies in 75,430,043 births).

Risk factors identified from 7 studies: male sex (1.36 (1.21-1.53), p<0.00001), maternal smoking (1.19 (1.09-1.29), p<0.0001), and maternal age >35 years (1.15 (1.04-1.27), p=0.007).

Conclusion: This is the first study investigating the worldwide epidemiology of CDH and revealing a paucity of population-based studies from a relatively small number of countries. The global prevalence of CDH varies within and across geographical world regions. The main risk factors for CDH identified are male sex, maternal smoking and older maternal age. More epidemiological studies, involving more world regions, are needed to identify possible strategies to prevent CDH.
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Hospital costs for childhood intussusception in Ontario from 2003-2016: a population-based study
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Purpose: While the management algorithms for pediatric intussusception have changed, the impact on hospital costs for intussusception in Ontario is unknown.

Methods: A population-based cohort study identified patients <18 years treated for intussusception January 2003-December 2016 in Ontario, Canada (N=1378). Universal healthcare coverage data linked at ICES was used. Total hospital costs included emergency department, hospitalization, and physician billings. Treatment was categorized as surgical alone, non-surgical (enema reduction), and failed non-surgical (failed enema requiring subsequent surgery). Costs were adjusted to 2016 Canadian Dollars. Kruskal-Wallis, Wilcoxon rank-sum tests and quantile regression were used to assess differences in cost by treatment modality and facility type (tertiary vs. community).

Results: Median costs for intussusception differed by treatment: non-surgical ($2,367), failed non-surgical($6,508), and surgical alone($8,863) (p<0.0001). The overall median per-patient cost of intussusception management did not change over the study period ($3,792 to $3,794; p=0.14). Costs associated with successful non-surgical management and surgical alone management did not change whereas costs associated with failed non-surgical management increased from $3,842 to $12,350 (p=0.0003). Overall cost was on average $1076.95 more expensive in community centres than tertiary hospitals (p=0.004). Length of stay was longest for surgical alone group (6 days) compared with other treatment groups (non-surgical 2 days; failed non-surgical 3 days; p<0.0001).

Conclusion: Treatment modality influenced hospital costs for intussusception, which were lowest for patients treated non-surgically. Costs were highest in the minority of patients who were treated in community centres. The overall per-patient costs associated with treatment of intussusception have not changed in the past two decades in Ontario.

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Screening for alcohol and substance use in pediatric trauma patients: a retrospective review
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Purpose: Alcohol and drug use in adolescence is associated with traumatic injuries, yet screening rates for substance use in pediatric trauma cases remains low. The aim of this study was to assess substance screening practices of pediatric trauma patients at a single Canadian pediatric tertiary care center.

Methods: Retrospective chart review of all pediatric trauma patients between the ages of 12-17 presenting to our institution between December 2008 and October 2018. Information regarding screening for alcohol and drug use, as well as injury specifics were ascertained. Continuous variables were analyzed using independent samples t-test and categorical using Chi-square where applicable. Significance was set at p<0.05.

Results: A total of 360 trauma patients were identified, of which 242(67%) were male. The Trauma Team was activated for 248(69%) patients and 179(50%) were admitted to the intensive care unit (ICU). Traffic accidents accounted for 50% of injuries. A blood alcohol test was conducted for significantly more patients (207,57.5%) than a urine drug screen (56,15.6%;p<0.00). Older patients and those with increased Injury Severity Scores (ISS) were significantly more likely to be screened for alcohol (p=0.02, p=0.028). Older age was found to be associated with being screened for drugs (p=0.00), but ISS was not (p=0.422). Gender was not associated with being screened for either alcohol or drugs.

Conclusion: Screening rates for substance use remain low. Institutional guidelines for alcohol and drug screening with referral for brief intervention in pediatric trauma patients could be instituted to avoid random screening and under-estimations of the true rates of substance involvement.

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Comparison of drugs used for intubation of pediatric trauma patients
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**Purpose:** Rapid sequence intubation (RSI) is a lifesaving approach to emergency intubation in trauma patients. Drugs used for RSI affect clinical outcomes, but this has not been examined in the pediatric population. This study compares the outcomes associated with intubation drugs used in pediatric traumatic brain injury (TBI) patients.

**Methods:** This was a retrospective chart review of intubated TBI patients from ages 0-17 admitted to Children’s Hospital London Health Sciences Centre (LHSC) from January 2006-December 2016. Descriptive statistical analysis was performed.

**Results:** 253 patients were intubated for TBI during the study period. Complete data was available for 107 cases, 67 male and 40 female. The average injury severity score was 28. 46 were intubated at LHSC, 55 at the primary care site and 6 on scene. Intubation attempts were recorded in 87 of 107 paper charts. First-pass intubation success rate was 88.5%. Propofol (n=21), midazolam (n=31), etomidate (n=13), and ketamine (n=7) were the most commonly used intubation drugs. Paralytics were used in 50% of patients. Following use of propofol, Pediatric Adjusted Shock Index was increased as a result of worsening hypotension. Mean total hospital LOS was 21 days with 7.5 days in ICU. Survival was 87%.

**Conclusion:** Great variability exists in the use of induction agents and paralytics for RSI. Propofol was commonly used and is potentially associated with poorer clinical outcomes. However, the study was underpowered due to over 50% missing data in paper charts. These results highlight the need for standardization of RSI at our institution.

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Postoperative opioid discharge prescription practices by the pediatric general surgery service at a Canadian tertiary pediatric centre

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Purpose: Opioid prescriptions can be a gateway to opioid abuse and addiction, and published data indicates a wide discrepancy in opioid prescription practices. Our goal was to assess the postoperative opioid prescription at discharge practices by the general surgery service at a Canadian tertiary pediatric centre.

Methods: REB approval was obtained (#1000062131). All patients that had undergone a minor or major surgery between July 1st and August 31st 2018 at a tertiary pediatric centre were screened for opioid prescriptions at discharge.

Results: 129 patients were included. 4 (3.1%) were discharged with opioid prescriptions:
* 2 Nuss pectus excavatum repairs
* 1 Abdominal neuroblastoma resection (laparotomy)
* 1 Hepatic tumour resection (laparotomy)

There were 56 appendectomies and 2 cholecystectomies performed during this time. Overall, there were 78 inpatient procedures (60.5% of procedures) and 51 outpatient procedures (39.5%). All outpatient and inpatient surgery patients were discharged with ibuprofen and acetaminophen prn. Both Nuss pectus excavatum repairs were referred to the transitional pain clinic and discharged with multimodal pain prescriptions including methocarbamol. Most patients receive local anesthetic, regional nerve blocks, or epidurals intraoperatively as indicated.

Conclusion: Only 3.1% of pediatric general surgery postoperative patients were discharged home with an opioid prescription over a two-month period at a large Canadian tertiary pediatric centre. This number is notably lower than many published statistics on postoperative opioid prescriptions. Given this discrepancy, national and international postoperative opioid prescription practices may warrant further scrutiny to minimize excessive or unnecessary postoperative opioid prescriptions while ensuring adequate postoperative pain management for patients.

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To cut or not to cut and other dilemmas: optimizing management of complex appendicitis

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**Purpose:** To determine the differences in morbidity between conservative and operative management of pediatric perforated appendicitis, and identify the optimal treatment pathway which minimizes readmission of patients for further treatment.

**Methods:** We conducted a retrospective chart review of perforated appendicitis patients admitted to our institution from January 1st 2016 to December 31st 2017 (REB#1000062459). Morbidity of conservative (CM n=152) and operative (OM n=151) groups was compared via mean values and T-tests. An optimal treatment pathway was derived from descriptive statistics of readmission rates.

**Results:** The groups differed in mean age (CM 8.84± 4.01vs OM 7.68± 3.38 years, p=0.01) and in duration of symptoms (CM 4.48 ± 3.21 vs OM 2.45 ± 1.31 days, p<0.001). CM patients had significantly greater morbidity (LOS, 7.23 vs 6.38 days p=0.003; antibiotic days, 15.8 vs 14.7 days p=0.0006; readmissions, 21 vs 10 p=0.004), but 40% did not undergo interval appendectomy. For both groups, four criteria were identified which yielded decreased readmission rates: 5 days of iv antibiotics, normal CBC, 24 hours afebrility before switching to PO antibiotics, discharge 24 hours after tolerating PO antibiotics.

**Conclusion:** We conclude that there was a significantly higher morbidity burden associated with conservative management, however, this was offset by a decreased proportion who underwent appendectomy. A proposed pathway (figure 1) for perforated appendicitis may decrease readmission rates.

**Figure 1:** Treatment pathway for perforated appendicitis.
At least 5 days IV antibiotics AND afebrile for at least 24 hours

Draw bloodwork for WBC

If normal

Transition to PO antibiotics

Keep in hospital to monitor tolerance for 24 hours

Discharge home on PO antibiotics

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Management and outcomes of children with abdominal pain and non visualized appendix on ultrasound
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Purpose: Ultrasound (US) has become the primary imaging modality for children with abdominal pain. However, a proportion of cases are noted to have a non-visualized appendix (NVA). The purpose of this report is to characterize our experience in patients with NVA and understand optimal management.

Methods: A retrospective review of all US performed for abdominal pain in children over a 5-year period was carried out. NVA cases were selected and clinical, Pediatric appendicitis score (PAS), and outcome variables collected. The cohort was divided into discharged, observed, and operated and univariate as well as multivariate analyses performed. P values of less than 0.05 were considered significant.

Results: Out of 746 US, 475 were NVA, with complete data for 446. Many US were done on low PAS patients, and a majority of NVA were in the night hours. Table depicts the results between cohorts. Multivariate regression found CT use and appendectomy was predicted by elevated CRP, male gender, higher PAS, and presence of nausea (p<0.05).

Conclusion: Non visualized appendix on ultrasound was very common. In patients with non visualized appendix, presence of nausea, male gender, and elevated C-reactive protein were useful predictors for CT use, need for appendectomy, or planned observation. Consistent use of clinical criteria would help refine overall ultrasound use and reduce resource utilization for children with abdominal pain.

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<tr>
<th>Comparing Outcomes in Children with NVA on US</th>
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<tr>
<td>Discharge from ED (n=305)</td>
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<td>Admit for Obs. (n=88)</td>
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<td>Appendectomy (n=53)</td>
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<td>P value (DC vs. Surg)</td>
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<td>Nausea (%)</td>
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<td>Fever&gt;38.0 (%)</td>
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<td>CT Scan</td>
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Failure to thrive: the socioeconomics of pediatric gastrostomy complications
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Purpose: Failure to thrive is a common indication for gastrostomy placement in the pediatric population. There are significant medical, emotional, and social implications for patients and caregivers. We hypothesized that socioeconomic status has a significant impact on gastrostomy complications.

Methods: IRB approval was obtained. A retrospective chart review was performed of 415 children with gastrostomy tubes over a six-year period. Patient data was merged with Census data including median household income, unemployment rate, health insurance status, poverty level, and caregiver education level. Statistical tests were conducted against a 2-sided alternative hypothesis with a 0.05 significance level. Outcomes examined were minor complications (granulation tissue and leaks) and major complications (infections and mechanical) in association with socioeconomic variables.

Results: Patients with a mechanical complication (241) were significantly younger, weighed less, and had a 72% greater chance of having commercial insurance. Patients with Medicare/self-pay (267) were three times more likely to have a minor complication. The average unemployment rate was 23% greater in families with a major complication (386). Individuals with a minor complication (29) came from community tracts with a lower percentage of families below the poverty level. None of the examined socioeconomic factors were independently associated with higher incidence of infection.

Conclusion: This study demonstrated a socioeconomic effect on subsequent gastrostomy complications. An increase in mechanical complications was observed among younger, smaller children. Insurance and employment status were more significant predictors than poverty level. Further work using these variables for targeted interventions to provide specific family support will allow these children and families to thrive.

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Pediatric trauma triage: who is the right patient?
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Purpose: We aim to determine what variables influence physicians to transfer a child with traumatic injuries from a Level III trauma center (LTC) to a pediatric trauma center (PTC), exploring differences between physicians who work in LTCs versus PTCs.

Methods: Emergency physicians in LTCs and emergency physicians and trauma team leaders in PTCs, across Canada, were surveyed with a random sampling of clinical scenarios of injured children presenting to a LTC with 5 parameters: age, hemodynamic status, Glasgow Coma Score (GCS), suspected/obvious intra-abdominal injury, suspected/obvious femur or pelvic fracture, and asked to decide if the patient should be transferred to a PTC or not. Association of each parameter as well as physician demographics on decision to transfer was determined.

Results: One-hundred-seven and 95 surveys were completed by physicians at LTCs and PTCs, respectively. Parameters strongly associated with transfer regardless of center designation were pelvic and GI tract injuries, presenting GCS<9 and age<4 years. Those practicing in LTCs were significantly less likely to recommend transfer with a presentation that included at least one of a femur fracture, suspected or confirmed solid organ injury or a history of hemodynamic instability (resolved after initial resuscitation) (p<0.0001 for all) than physicians at PTCs.

Conclusion: Injuries requiring potential surgical management and/or critical care strongly influence the decision to transfer as does young age. For cases with lesser severity or older ages, input of regional LTCs on developing triage criteria within a trauma system is vital to allow families to stay in their home communities while ensuring optimal clinical outcomes.

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An assessment of provider satisfaction with the use of a standardized visual aid for informed consent for appendectomy in children
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Purpose: We have previously reported that using a simple visual aid improves the process of obtaining consent prior to appendectomy. In this study, we evaluated time added by using the visual aid and provider perceived value of using the visual aid.

Methods: An IRB approved survey was developed to assess ease of use, provider opinion, and time required for use of the visual aid. This was distributed and analyzed via Research Electronic Data Capture (RedCap) Database.

Results: 58 surveys were administered. Voluntary participants included attendings (n=2), fellows (n=1), residents (n=15), and physician assistants (n=17). 65% reported obtaining consents for > 2 years and 58% reported having obtained > 50 consents for appendicitis. Only 1 provider reported using the visual aid less than 3 times and 50% of providers had used it >10 times. The most common reason for not using the visual aid was not remembering that it was available. 8/20 (40%) did not feel using the visual aid added any time; 9/20 (45%) felt it added a small amount of time. Most importantly, 11/21 (52%) of providers felt using the visual aid significantly increased the family’s ability to give informed consent; making the process easier for both providers and families.

Conclusion: Using a visual aid in consenting families for appendectomy does not add significant time and subjectively improves the process for both providers and providers perception of parents understanding. We recommend the use of a visual aid when consenting families of children with appendicitis.

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Management of the normal-appearing appendix during laparoscopy for clinically suspected acute appendicitis in the pediatric population

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Purpose: The use of the appendix in reconstructive surgery has brought forth the question of whether a macroscopically-normal appearing appendix should be removed in cases of clinically suspected acute appendicitis. This study aimed to determine the current clinical practices of Canadian pediatric general surgeons regarding this matter.

Methods: An online survey was created following the American Pediatric Surgical Association (APSA) guidelines for surveys and distributed via email to all surgeon members of the Canadian Association of Pediatric Surgeons (CAPS). The questions assessed clinician characteristics, standard practice, and rationale for practice preferences. Results were analyzed using descriptive statistics and basic thematic analysis.

Results: A total of 54/72 (75%) CAPS members practicing in Canada completed the survey. All respondents were staff level with 92.6% (50/54) having practiced for >5 years and 90.7% (49/54) performing >25 appendectomies per year. All respondents agreed they would remove a normal appearing appendix during laparoscopy for suspected acute appendicitis. The most common reasons were: possibility of endo/microscopic appendicitis (39, 72.2%), avoiding future diagnostic confusion (28, 51.9%), and patient preference/terms of the consent discussion (21, 38.9%). All but one had removed an appendix pathology later deemed normal. The majority (49, 90.7%) agreed there were not sufficient guidelines on the topic.

Conclusion: The majority of pediatric surgeons agree sufficient guidelines do not exist to support decision making when a macroscopically normal appearing appendix is found during laparoscopy for suspected acute appendicitis. This survey shows that removal of the appendix in this case would be supported by the majority of Canadian pediatric surgeons.

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Long-term outcomes of severe surgical necrotizing enterocolitis
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Purpose: We sought to describe long-term outcomes of infants with severe surgical necrotizing enterocolitis (NEC).

Methods: Data were collected retrospectively on infants with surgical NEC treated at a single multidisciplinary intestinal rehabilitation center from 2009-2018. Severe NEC was defined by extensive bowel loss with residual bowel length of <30cm. A subset of “NEC-totalis” was identified by the surgeon’s operative report. Post-operative management practices and long-term outcomes including achievement of enteral autonomy, severe neurodevelopmental disability, and educational attainment were assessed.

Results: Of 268 infants with surgical NEC, 27(10%) had severe NEC and another 14(5%) were identified as “NEC-totalis”. No severe NEC patients, compared to 8 (57%) “NEC-totalis” patients were placed on comfort measures, following initial surgery (p<0.001). Twenty-five patients (93%) with severe NEC survived compared to three of six with “NEC-totalis” (p<0.001). Those with severe NEC had a percent residual bowel length [10(8,12)%] that was not significantly different than surviving patients identified as “NEC-totalis” [20(10, 21)%]. The 28 survivors (68%) were followed for a median (IQR) duration of 8(4,10) years. Nine (32%) with severe NEC weaned from parenteral nutrition with long-term intestinal rehabilitation. Eight (29%) had 1 or more marker for severe neurodevelopmental disability, and 11/16 (69%) patients 7-16 years of age were attending school at last follow-up.

Conclusion: The long-term achievement of enteral autonomy is feasible in patients with severe NEC. The majority of patients who survive do not have severe neurodevelopmental disability and participate in school. Given current survivals and outcomes, focus on measured residual bowel length may be more appropriate than the subjective term “NEC-totalis.”

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Gastrografin for the management of paediatric adhesive small bowel obstruction: a systematic review
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Purpose: In paediatric patients, rates of post-operative adhesive small bowel obstructions (ASBOs) range from 3.3-8.3%. While most adult ASBOs are managed conservatively, the rate of surgical management is high in children. Water-soluble contrast agents, such as gastrografin, are used for diagnostic and therapeutic purposes in the conservative management of adult ASBOs. However, the role of gastrografin in the management of paediatric ASBOs is not clear, and no recommendations currently exist for its use. We sought to systematically review the current literature on the use of gastrografin in paediatric ASBOs.
Methods: Pubmed, Cochrane and Embase databases were searched systematically. The primary outcome was the treatment success of gastrografin in paediatric ASBOs, ie. resolution without surgery. Secondary outcomes included length of stay, time to full feeds and complications.
Results: Four studies were included. Two retrospective and two prospective studies. These studies employed different gastrografin protocols, limiting their comparability. However, following conservative treatment with gastrografin, need for surgery ranged from 16-33% compared to 45-50% in controls. Presence of gastrografin in the cecum or ascending colon was predictive of resolution. No recurrences or complications were noted.
Conclusion: In conclusion, use of gastrografin as part of a conservative strategy was associated with a decreased rate of surgery in the four studies included. This review is limited by the small number and heterogeneity of the studies and highlights the need for larger, prospective studies before recommending and creating guidelines for the use of gastrografin in paediatric ASBOs.

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Use of transient elastography to determine liver fibrosis in pediatric intestinal failure
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Purpose: Liver complications remain a major challenge in intestinal failure (IF) and monitoring of liver biochemistry is not sufficient to predict progressive disease. Our objective was to evaluate the use of transient elastography (TE) in pediatric IF patients to determine its efficacy for monitoring liver fibrosis.

Methods: A retrospective cohort study of IF patients managed between January 1, 2015 to December 31, 2017. Patients who had a liver biopsy and TE were included. Demographic and liver function data was collected (conjugated bilirubin, ALT, AST, platelet count). Univariate analysis and Chi-square was completed. High versus low fibrosis and TE scores were compared to determine sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV).

Results: 30 patients [21 male (70%); median age at biopsy 320 days (154-1776)] were evaluated. Individuals with fibrosis scores of 0-1 (n=18) had a median TE score of 4.9 (3.9-7.1), fibrosis scores of 2 (n=5) had a median TE of 6.7 (4.4-11.4) and those with a fibrosis score of 3 (n=7) had a median TE of 12.1 (6.3-14.6). No patients had grade 4 fibrosis. When we evaluated the fibrosis scores dichotomized into low (fibrosis 0-2) and high (fibrosis 3-4) and compared to the chronic cholestatic scale for the Fibroscan. For those with low scores, TE had a 95.7% sensitivity, 57.1% specificity, an 88.0% PPV and an 80.0% NPV. The c-statistic for the ROC curve was 0.764.

Conclusion: The utility of TE remains unclear, but shows potential as a non-invasive method to monitor fibrosis in IF. Further evaluation is required.

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Pasteurized human breast milk exosomes attenuate the intestinal damage in necrotizing enterocolitis

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Purpose: Breast milk prevents the development of necrotizing enterocolitis (NEC). Exosomes are nano-scaled vesicles contained in fresh raw human breast milk (HBM) which can protect against NEC. However, pasteurization of HBM may affect the biological function of exosomes. The aim of this study was to investigate whether exosomes derived from pasteurized HBM have the same protective effect against NEC as exosomes derived from raw HBM.

Methods: Following ethical approval (#44032), mice pups were randomly assigned to the following 4 groups. (i) Breastfed control (ii) NEC (iii) NEC receiving exosomes from raw HBM (raw exosome NEC). (iv) NEC receiving exosomes from pasteurized HBM (pasteurized exosome NEC). NEC was induced using hypoxia, gavage administration of lipopolysaccharide and formula. After NEC induction, the ileum was evaluated for severity of mucosal injury (HE staining) and inflammation (IL6 by qPCR).

Results: NEC induction was associated with significant mucosal injury. However, this injury was reduced in both raw and pasteurized HBM derived exosomes (Figure A,B). Similarly, IL6 was lower in both exosome NEC groups compared to NEC alone (Figure C).

Conclusion: Exosomes derived from raw and pasteurized HBM equally reduced the intestinal damage caused by NEC. Exosomes administration can be translated into clinical practice as exosomes can be derived from bank HBM which underwent pasteurization.
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raw exosomes NEC: NEC receiving exosomes from raw human breast milk
pasteurized exosomes NEC: NEC receiving exosomes from pasteurized human breast milk
*p<0.05
Diuresis as an indicator of the resolution of ileus
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Purpose: The timing of diet advancement after post-operative ileus is generally guided by subjective clinical criteria. Studies show that none of the currently used indicators accurately predict the timing of ileus resolution and diet toleration. We hypothesize that auto-diuresis is an early indicator of ileus resolution.

Methods: A single center retrospective chart review was performed on pediatric patients with laparotomies from 9/30/2016 to 2/15/2019. Daily post-operative urine output was profiled on a lasagna plot. An accelerated failure time model was created to estimate the association between increased urinary output (100 cc above average) and time to first flatus or stool.

Results: Twenty-seven patients were included, with 33 total surgeries. Five surgeries were excluded for lack of fluid status information, and one surgery was excluded because of re-exploration for an unresolved ileus. Median time to first flatus or stool was 2.5 days (range 1 to 8).

The lasagna plot shows considerable inter-patient variability in postoperative urine output profiles (Figure 1). Diuresis was associated with a shorter time to first flatus or stool (HR per 100 cc increase=1.07, 95% CI: 0.998, 1.15; P=0.058).

Conclusion: We conclude that auto-diuresis may be an early indicator of resolution of ileus, but evaluation of a larger data set with more information about oral intake and potentially confounding patient factors is necessary.
Urine Output by Post-Operative Day
Short-chain fructo-oligosaccharides modify the microbiota in experimental necrotizing enterocolitis

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Purpose: Short-chain fructo-oligosaccharides (scFOS) are prebiotic oligosaccharides that modulate host inflammatory responses by altering the gut microbiota. We have shown that scFOS protect the intestinal damage in experimental necrotizing enterocolitis (NEC). The aim of this study is to further investigate whether the protective effect of scFOS is due to the change in the intestinal microbiota.

Methods: NEC was induced in C57BL/6 mice by combination of hypoxia, gavage feeding of hyperosmolar formula and lipopolysaccharide administration between postnatal days 5 and 9. Control groups (n=4) remained with their mother to breastfeed, whereas NEC groups received daily gavage feeding of formula with added phosphate buffered saline (PBS; n=4) or scFOS (5mg/g; n=8). After sacrifice, the distal ilea were harvested to study the bacterial populations by qPCR. P < 0.05 was considered significant.

Results: Lactobacillus expression was significantly decreased in the NEC groups compared to control groups (p=0.02, Figure). Administration of scFOS significantly increased the bacterial load of Lactobacillus in NEC mice compared to NEC+PBS (p<0.01, Figure).

Conclusion: Short-chain fructo-oligosaccharides rescued the expression of Lactobacillus in the intestine which helps protect the intestinal damage in NEC. This study demonstrates the mechanism involved in the protective effect of short-chain fructo-oligosaccharides prebiotics in NEC. Administration of these prebiotics should be considered for preventative management in neonates at risk of developing NEC.
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Transcriptome analysis of the intestinal regeneration network in necrotizing enterocolitis
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Purpose: Intestinal regeneration is vital to maintain intestinal epithelial viability. However, during necrotizing enterocolitis (NEC) intestinal regeneration is impaired. The aim of this study is to investigate the transcriptome levels of intestinal regeneration during experimental NEC.

Methods: Experimental NEC was induced in mice pups by gavage feeding of hyperosmolar formula, hypoxia and lipopolysaccharide administration during postnatal days 5-9 (AUP #32238). At P9, ileal tissue RNA was isolated and analyzed by RNA-sequencing. Sequencing was performed on the Illumina HiSeq and mapped to the mouse genome using STAR. GO term enrichment was performed using DAVID. Heat maps were generated using R and heatmap package.

Results: Alterations in gene expression between NEC and control groups were apparent. In NEC a total of 740 genes were up-regulated and 359 genes were down-regulated (Figure 1A). Genes involved in epithelial regeneration was significantly decreased, including Lgr5 and Olfm4, which are mitotically-active markers of intestinal stem cells (Figure 1B, C).

Conclusion: The transcriptome analysis demonstrated that intestinal regeneration networks were disregulated in experimental NEC. These data increase our understanding of the intestinal regeneration in NEC and provide useful therapeutic targets to improve recovery from intestinal injury.
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Predictors of D-lactic acidosis in children with small bowel bacterial overgrowth and intestinal failure

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**Purpose:** D-lactic acidosis is a metabolic derangement accompanied by neurologic abnormalities that can occur in patients with intestinal failure (IF). We evaluated the predictors of D-lactic acidosis in children with IF treated for small bowel bacterial overgrowth (SBBO).

**Methods:** We retrospectively reviewed data from children 0-18 years of age diagnosed with IF from 2010-2018 who had a clinical diagnosis of SBBO and were tested for D-lactic acidosis. Multivariable logistic regression was also performed.

**Results:** Of 46 patients suspected of having D-lactic acidosis, 23 were found to have positive D-lactate levels (>0.25 mmol/L), while another 23 were negative for D-lactic acidosis. There was no significant difference in gestational age, sex, or age at time of testing. Midgut volvulus was the most common underlying cause of IF in those who developed D-lactic acidosis (13% vs 56.5%, p<0.001). Patients with D-lactic acidosis also had significantly lower serum bicarbonate levels with a median (IQR) of 19 (16,23) vs 24 (21,25) mEq/L (p=0.001) and were less likely to be PN-dependent (26% vs 62%, p=0.017). While there was a trend toward decreased percent predicted bowel length in patients with D-lactic acidosis, this result was not significant (12.53 vs 17.24%, p=0.07).

Multivariable analysis identified midgut volvulus as the most significant independent predictor associated with D-lactic acidosis (OR 8.97; 95% CI: 1.97,40.88, p=0.005).

**Conclusion:** D-lactic acidosis is an important complication of SBBO in children with IF. The most significant predictor for the evolution of D-lactic acidosis in these patients is an underlying diagnosis of midgut volvulus.

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A combined sternotomy/laparotomy approach in central tendon diaphragmatic hernia repair

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Purpose: To describe a combined sternotomy/laparotomy approach as a novel technique in central tendon diaphragmatic hernia repair.

Methods: During a routine second trimester prenatal ultrasound, a 19-year-old woman was found to have a fetus with a diaphragmatic hernia. Subsequent fetal MRI at 28 weeks demonstrated a large central tendon defect through which the majority of the liver was herniated (Figure). The fetus was closely followed until delivery at 38 weeks. The patient was intubated shortly after delivery and treated for pulmonary hypertension. A thoraco-abdominal CT scan was obtained (Figure). By day of life 7, the patient demonstrated physiological stability and the decision was made to proceed to surgery following a multidisciplinary meeting.

Results: A sternotomy with an upper midline laparotomy revealed the liver herniating through a central tendon defect without any hernia sac (Figure). Hepatic veins were located in their normal infradiaphragmatic position. The liver was reduced into the abdomen without kinking the hepatic veins. The defect was then closed using a polytetrafluoroethylene patch. The patient did not develop compartment syndrome despite pre-operative concerns. Post-operatively, she was weaned to conventional mechanical ventilation after briefly requiring high-frequency oscillatory ventilation, and subsequently extubated.

Conclusion: A combined sternotomy/laparotomy provided an excellent operative exposure. The technique may facilitate a safe closure in a large congenital central tendon diaphragmatic hernia.
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Intra-operative near infrared spectroscopy imaging: a novel strategy for assessing and predicting intestinal viability in emergency pediatric surgery

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Purpose: To explore the use of near-infrared (NIR) spectroscopy imaging in the evaluation of intestinal viability during pediatric emergency surgery.

Methods: Background: Bowel viability can be difficult to evaluate during emergency pediatric surgery. Decision making related to the extent of bowel resection is often burdensome due to the challenge of predicting long-term viability in ischemic bowel. NIR fluorescent angiography has been demonstrated to help assess intestinal perfusion during elective and emergency surgery. However, this technology administration of specialized dyes and camera systems. A new handheld camera device is available and has the benefit of being completely non-invasive. These devices can generate objective measurements of perfusion providing improved insight into oxygen availability in the tissue. Real-time perfusion information may limit the loss of bowel in low-flow states leading to short gut.

Methods: Intra-operative NIR photographs of normal, indeterminate, and ischemic bowel were taken in three patients. The device generated measurements of tissue perfusion in the segments of bowel photographed (Figure 1). Patients with indeterminate bowel and a planned second look were photographed at the time of second look to determine the level of previously measured perfusion associated with intestinal survival.

Results: The NIR camera successfully suggested levels of intestinal perfusion intraoperatively in all patients.

Conclusion: This technology may be useful for reducing the need for second look laparotomy.
Thrombolysis and thrombectomy rescue therapy by combined intra-venous and intra-arterial route in infants with superior mesenteric vein thrombosis.

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Purpose: Superior Mesenteric vein (SMV) thrombosis may lead to catastrophic loss of small bowel and short bowel syndrome. In neonates and infants with advanced intestinal ischemic injury, rescue of damaged bowel is vital. We describe the use of combined superior mesenteric thrombolysis and thrombectomy in neonates/infants with SMV thrombosis and massive intestinal damage.

Methods: Since 2012, four patients with SMV thrombosis and severe ischemic intestinal damage underwent superior mesenteric thrombolysis and thrombectomy. In all patients, Urokinase (2000 IU/kg) was injected in the Superior Mesenteric artery (SMA) and in 2 SMV thrombectomy was associated using a 2 Fr Fogarty catheter. No immediate bowel resection was made and a second look operation, after 48-72 hours, was performed if indicated.

Results: Table shows main patients’ characteristics. No death nor complications related to the procedure occurred and all patients had a variable length of bowel (from 36 to 75 cm) that regained adequate perfusion. All are alive at a follow-up ranging from 22 to 69 months, and all except one have been weaned off parenteral nutrition, 68 to 273 days after thrombolysis.

Conclusion: In neonates and infants with SMV thrombosis and massive ischemic intestinal injury, thrombolysis with SMA urokinase injection and SMV thrombectomy may represent a valid rescue therapy allowing to recuperate damaged bowel, thereby avoiding irreversible intestinal failure.
<table>
<thead>
<tr>
<th>Pt</th>
<th>Diagnosis</th>
<th>Age at thrombolysis</th>
<th>Thrombectomy</th>
<th>Remaining bowel</th>
<th>Follow-up (months)</th>
<th>TPN status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gastroschisis; midgut volvulus</td>
<td>2 days</td>
<td>Yes</td>
<td>small bowel 45 cm; ICV-; colon 75%</td>
<td>69</td>
<td>Weaned, 273 days post-op</td>
</tr>
<tr>
<td>2</td>
<td>Previous ileal atresia; midgut volvulus</td>
<td>1 month</td>
<td>No</td>
<td>small bowel 36 cm; ICV +; Colon 100%</td>
<td>47</td>
<td>Weaned, 181 days post-op</td>
</tr>
<tr>
<td>3</td>
<td>Midgut volvulus</td>
<td>3 days</td>
<td>Yes</td>
<td>small bowel 65 cm; ICV +; colon 100%</td>
<td>22</td>
<td>30% total caloric intake</td>
</tr>
<tr>
<td>4</td>
<td>Hirschspring’s disease; Noonan syndrome</td>
<td>3 months</td>
<td>No</td>
<td>Small bowel 75 cm; ICV -; colon 66%</td>
<td>16</td>
<td>Weaned, 68 days post-op</td>
</tr>
</tbody>
</table>

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Pull-through procedure in children with Hirschsprung’s disease: a nationwide analysis on postoperative outcomes

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Purpose: Currently there are no nationwide studies on hospital readmissions for children who have undergone pull-through operations for Hirschsprung’s disease. The purpose of this study is to identify determinants of postoperative discharge outcomes and hospital readmissions in children with Hirschsprung’s disease.

Methods: The Nationwide Readmissions Database for 2010-2014 was queried for children (<18yo) with Hirschsprung’s disease who had undergone pull-through procedure, utilizing ICD-9 codes 751.3 and 48.4 respectively. Outcomes recorded included complications and readmissions at 30-day and 1-year. Results were weighted for national estimates.

Results: The cohort consisted of 3,635 patients, 75% male and 79% < 1 year of age. Readmission rates at 30 days and 1-year were 20% and 36% respectively, with a 4% rate of readmissions for additional surgery. Overall, the most common diagnoses for readmission were gastrointestinal disorders (15%) and infections (14%). All age groups had a >10% readmission rate for gastrointestinal disorders. Infants were more likely to be admitted for enterocolitis and infections (16% and 15%) while children (1-6 years old) were most commonly readmitted for electrolyte disturbances (12%). Stricture rate (2%) and rectal disimpaction rate (2%) were higher in children <6 years of age, while readmissions for rectal dilation was highest for children > 6 years of age. Total hospitalization cost was over $170 million with $33 million due to readmissions.

Conclusion: Pull-through procedure for Hirschsprung’s disease is associated with high readmission rates and a significant associated economic burden. Age specific interventions to preclude readmissions could improve outcomes and curtail healthcare spending.

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Restoration of portal venous flow leads to improvement of liver masses in patients with an Abernethy malformation

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Purpose: The absence of portal venous flow (PVF) is associated with an increased incidence of benign and malignant liver masses as seen in patients with congenital portosystemic shunts (the Abernethy malformation, AM). We characterized the liver masses that occur in pediatric AM patients and hypothesized that restoring PVF leads to resolution of liver masses.

Methods: A retrospective review of all patients with an AM found to have ≥1 liver mass on imaging (1997-2018, n=12) was performed at our center (IRB #2016-338). Masses suspicious for malignancy or atypical for age were biopsied (n=7). Chi-square test was used for statistical analysis. p<0.05 was considered significant.

Results: 12 patients with an AM (6 male) were found to have ≥1 liver mass (12/48, 25%). Neither gender (6/19 male v. 6/29 female, p=0.39) nor type of shunt (6/25 type I v. 6/23 type II, p=0.87) was associated with occurrence of liver masses. Most masses were reported as benign on imaging (10/12, 83%). Focal nodular hyperplasia was most commonly identified (6/12). Malignant lesions (hepatoblastoma, n=2) and lesions at risk for malignant transformation (hepatocellular adenoma, n=1) were also diagnosed. Among the 10 patients that underwent ligation of the AM, 5 experienced complete resolution of masses. The remaining patients showed either reduction in size or of the number of masses on imaging. 2 patients died before undergoing ligation.

Conclusion: Redirecting splanchnic venous blood flow to the liver in AM patients leads to complete resolution or improvement of liver masses. Early intervention is recommended as malignant transformation can occur.

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The evolution of early liver biopsy findings in babies with jaundice may delay the diagnosis and treatment of biliary atresia

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Purpose: To identify early findings on liver biopsy that delayed the diagnosis of biliary atresia (BA), and how repeat biopsies evolved over time.

Methods: 6 patients underwent >1 liver biopsy for neonatal jaundice and were included (1997-2018, IRB #2007-12989). Clinical and histological data were collected. Chi-square test was used for statistical analysis. p<0.05 was significant.

Results: 5 patients had 2 biopsies and 1 had 3. Median gestational age was 37 weeks [32.4-39]. Median age at first biopsy was 40 days [13-57], 68.5 days [35-78] for second, and 133 days for third. Histological findings are presented in Table 1. Steatosis was identified initially in 4/6 biopsies, but in none on final biopsy (0/6) (p=0.014). Portal edema wasn’t seen initially, but was noted on repeat biopsy in 3/6 patients (p=0.046). Bile duct proliferation was found in 6/6 final biopsies, but only 1/6 initial biopsy (p=0.003). All patients underwent a portoenterostomy (median age 75 days [43-113]). Median delay between initial biopsy and Kasai was 29 days [14-67]. Transplant free survival (5 patients) ranged from 184-716 days (median 309 days). One patient died on the transplant waiting list.

Conclusion: We conclude that early liver biopsy may not display characteristic findings of BA. Those appear on subsequent evaluation. Delay in repeat biopsy when BA is suspected has an adverse effect on successful bile drainage.

<table>
<thead>
<tr>
<th>Table 1. Histology findings on initial and final liver biopsies</th>
<th>Initial biopsy</th>
<th>Final biopsy</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biliary changes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bile duct injury</td>
<td>6/6, 100%</td>
<td>6/6, 100%</td>
<td>-</td>
</tr>
<tr>
<td>Bile duct proliferation</td>
<td>1/6, 17%</td>
<td>6/6, 100%</td>
<td>0.003</td>
</tr>
<tr>
<td>Bile plugs</td>
<td>4/6, 67%</td>
<td>3/6, 50%</td>
<td>0.56</td>
</tr>
<tr>
<td>Inflammatory changes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portal inflammation</td>
<td>3/6, 50%</td>
<td>3/6, 50%</td>
<td>-</td>
</tr>
<tr>
<td>Portal edema</td>
<td>0/6, 0%</td>
<td>3/6, 50%</td>
<td>0.046</td>
</tr>
<tr>
<td>Fibrosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portal fibrosis</td>
<td>4/6, 67%</td>
<td>4/6, 67%</td>
<td>-</td>
</tr>
<tr>
<td>Miscellaneous parenchymal changes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholestasis</td>
<td>6/6, 100%</td>
<td>6/6, 100%</td>
<td>-</td>
</tr>
<tr>
<td>Multinucleated giant hepatocytes</td>
<td>5/6, 83%</td>
<td>6/6, 100%</td>
<td>0.30</td>
</tr>
<tr>
<td>Steatosis</td>
<td>4/6, 67%</td>
<td>0/6, 0%</td>
<td>0.014</td>
</tr>
</tbody>
</table>
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Is there a need for a formal gynaecology curriculum in a paediatric surgery training program? A needs assessment
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Purpose: The Royal College of Physicians and Surgeons of Canada requires that fellows in Paediatric Surgery learn to manage a variety of gynaecologic conditions. We completed a needs assessment of Paediatric Surgery training programs to inform development of a gynaecology curriculum.

Methods: A survey was sent to Program Directors of Canadian Paediatric Surgery training programs with 27 questions that focused on their program, their own surgical practice, their trainees’ exposure to paediatric and adolescent gynaecology, and how they envision a standardized gynaecology curriculum.

Results: Preliminary results are based on responses from 5/8 Program Directors. Two respondents believed their trainees would work at a hospital without Paediatric and Adolescent Gynaecology in the future. All respondents had treated ovarian-related conditions and genital injuries in the past 5 years and most felt their trainees received adequate training in managing these conditions. Most respondents felt their trainees had minimal or inadequate training in imperforate hymens, müllerian anomalies, vulvar abscesses, vaginal foreign bodies, and labial adhesions. Program Directors currently allot an average of 3.5 hours to delivering the gynaecology objectives. Time constraints are currently the biggest limitation to meeting the objectives. All Program Directors expressed interest in a formal gynaecology curriculum delivered through some combination of case-based teaching and/or simulation.

Conclusion: There is a need for a standardized gynaecology curriculum for Paediatric Surgery trainees. Most Paediatric Surgeons will manage gynaecological conditions as part of their practice and current Program Directors feel that training is inadequate for a number of gynaecological conditions included in the Royal College Objectives of Training.

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Transanal endorectal pull-through for Hirschsprung’s disease: neonatal experience of a tertiary care center
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Purpose: Optimal surgical management of Hirschsprung disease (HD) remains debate. The two main options are nowadays the transanal endorectal pull-trough (TERP) and the Soave procedure (laparoscopic or open assisted). Aim of the present study is to evaluate short-term outcome of patients treated according to TERP procedure comparing with Soave procedure.

Methods: We performed a retrospective review of all our patients treated for HD from 2000 and 2018. In 2004, TERP procedure became our treatment of choice for HD patients. Early and short-term outcomes (6 months) were evaluated. Age at operation, laparotomy, stoma, operating time, discharge, complications and functional results were analyzed.

Results: Since 2000, 149 patients HD were treated: 99 infants were operated younger than 3-month (32 less than 28 days). Patients were categorized based on surgical technique used: 133 TERP procedure and 16 Soave. No differences among groups with respect to gender 15 (94%) vs 109 (82%) p 0.8, gestational age 37.8 (37-42) vs 37.2 (25-41) p 0.65, chromosomal abnormality 5 (31) vs 31 (23) p 0.56. Table summarized main results.

Conclusion: Our data suggests that TERPT procedure reduce morbidity, post-operative complications and hospitalization. About 1/3 of patients treated with TERPT required conversion for longer aganglionic tract. TERPT is safe and effective for the treatment of HD also in neonatal population and also less invasive compared with Soave open approach.

<table>
<thead>
<tr>
<th>TOT N= 149</th>
<th>SOAVE (N=16)</th>
<th>TERPT (N=133)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal-sigmoid agangliar tract (%)</td>
<td>9 (56)</td>
<td>85 (64)</td>
<td>0.6</td>
</tr>
<tr>
<td>Total colonic/ right colon (%)</td>
<td>4 (25)</td>
<td>16 (12)</td>
<td>0.2</td>
</tr>
<tr>
<td>Stoma pre-operation (%)</td>
<td>12 (75)</td>
<td>21 (16)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Mean operating time (min)</td>
<td>240 (180-400)</td>
<td>190 (160-228)</td>
<td>0.03</td>
</tr>
<tr>
<td>Age at operation median (range) days</td>
<td>106 (22-237)</td>
<td>52 (9-388)</td>
<td>0.2</td>
</tr>
<tr>
<td>Laparotomy %</td>
<td>16 (100)</td>
<td>49 (37)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Post-op. hospital stay median (range) days</td>
<td>14 (6-122)</td>
<td>7 (4-20)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Surgical complications post pull-through (%)</td>
<td>9 (56)</td>
<td>9 (7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Post-operative enterocolitis (%)</td>
<td>11 (69)</td>
<td>40 (30)</td>
<td>0.003</td>
</tr>
</tbody>
</table>
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Neonatal treatment of Hirschsprung disease: does younger age at surgery increase the risks?
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Purpose: Optimal timing for correction of Hirschsprung Disease (HD) is still debated, with many authors considering neonatal age at risk for increased operative and post-operative complications. Aim of the present study was to evaluate our experience in treating recto-sigmoid HD according to age at transanal endorectal pull-through (TERPT).

Methods: This is a retrospective study, analyzing all patients treated for recto-sigmoid HD in our tertiary referral Center, from 2004 to 2018. TERPT was performed in all cases. Patients were categorized based on age at TERPT: neonatal group (<28-day) Group A, and older patients (>28-day) Group B. Clinical characteristics, operative and post-operative complications were evaluated up to 1 year of age. Fisher exact test and Mann-Whitney test were used as appropriate.

Results: During the study period 122 HD patients were treated: HD was limited, at definitive histology, to recto-sigmoid tract in 71 patients. Group A consists of 20 newborns surgically treated before 28-day, Group B of 51 patients treated at older age. Table 1 summarized main results.

Conclusion: Our data suggest that TERPT is safe and effective procedure also during neonatal period. Although non-statistically significant, a slightly longer hospital stay was observed in group A patients, however similar outcomes were observed in the two groups. Further studies are needed to better characterize possible neonatal surgical risks.

<table>
<thead>
<tr>
<th></th>
<th>TOT N= 71</th>
<th>Group A (N=20)</th>
<th>Group B (N=51)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age median(range) week</td>
<td>38 (38-40)</td>
<td>38.5 (37-39.7)</td>
<td>0.6</td>
<td></td>
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<tr>
<td>Chromosomal abnormality (%)</td>
<td>1 (5)</td>
<td>11 (22)</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>Stoma pre-operation (%)</td>
<td>0</td>
<td>6 (12)</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Laparotomy %</td>
<td>4 (20)</td>
<td>10 (20)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Post-op. hospital stay median (range) days</td>
<td>24 (22-33)</td>
<td>17 (9-24)</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Surgical complications post pull-through (%)</td>
<td>1 (5)</td>
<td>6 (12)</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Post-operative enterocolitis (%)</td>
<td>9 (45)</td>
<td>15 (29)</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Stenosis %</td>
<td>2 (10)</td>
<td>3 (6)</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Mortality %</td>
<td>0</td>
<td>1 (2)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
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Development of a decision aid for pediatric surgery: interval appendectomy
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Purpose: Following recovery from non-surgical treatment for perforated appendicitis, patients and families are often faced with the decision of elective surgery or a conservative approach. As result, parents may face decisional conflict. The purpose of this study is to conduct a needs assessment for a patient decision aid (PtDA) to aid families in the decision-making process.

Methods: Semi-structured individual interviews informed by our previous systematic reviews were conducted to investigate decisional needs of patients and families who are in the treatment decision-making process and who have already made the decision. Transcripts were analyzed using the constant comparative approach.

Results: During 2018-19, a total of 13 interviews have been conducted with 12 families. Five families were uncertain about the decision, four opted for elective surgery, and three decided on a conservative approach. The vast majority families expressed decisional conflict and all strongly believed a decision aid would have been useful in their decision-making experiences. Features of a useful PtDA included general information on the condition (e.g., prevalence, severity, long-term effects) and prognosis, treatment options (risks and benefits), recovery information, symptoms of recurrence, and a guide to decision-making. Many expressed the desire for visual graphics to keep content simple and clear. Timing for when the PtDA should be delivered varied, with preferences ranging from during hospital admission to at the 6 week follow-up appointment.

Conclusion: This is the first step in developing a PtDA in pediatric surgery. Results indicate a strong need for a patient decision aid.

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Stool samples can be used to characterize the microbiota of the more proximal small bowel in infants with short bowel syndrome

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Purpose: Babies with short bowel syndrome (SBS) have intestinal microbial disturbances, that impact gut function. However, characterizing the small bowel microbiota is challenging, and the accuracy of sampling stool is unclear. This study determines if fecal samples accurately represent the proximal microbiota in SBS.

Methods: Stool samples were collected (2016-2017) from infants with SBS and colon in continuity (COLON), and SBS with small bowel ostomy (sbSTOMA). The abundance of the major bacterial genera was compared between groups and to healthy controls using 16S rRNA sequencing. Kruskall-Wallis test was used for analysis with P values <0.05 considered significant.

Results: After IRB approval, samples (n=41) were collected from 15 infants with SBS (9 sbSTOMA and 6 COLON) and from 3 healthy infants. Demographics and small intestinal anatomy did not differ between sbSTOMA and COLON, but sbSTOMA babies were receiving more parenteral nutrition support (77kcal/kg/d vs. 49 kcal/kg/d, p=0.04. The microbiota of both SBS groups differed significantly from healthy controls. However, there were no significant differences between sbSTOMA and COLON groups in the relative abundance of facultative or obligate anaerobes, anti-inflammatory Clostridia, Enterobacteriaceae, Bifidobacterium or Lactobacillaceae (Figure 1).

Conclusion: Infants with SBS have significant disturbances to their intestinal microbiota. Sampling small intestinal effluent is challenging. Stool samples are easier to obtain and may provide an accurate analysis of the proximal microbial community.

![Figure 1](image.png)

Relative abundance of major bacterial genera among healthy controls and infants with SBS with and without small bowel stomal. ns, not significant, \(p<0.05\), \(**p<0.01\), \(***p<0.001\), Mann-Whitney test.

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Open surgical cut-down versus percutaneous central venous catheterization and associated complications in pediatric populations: a systematic review and meta-analysis
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Purpose: Purpose: Central venous catheterization (CVC) is commonly performed in children for the management of conditions such as cancer and providing parenteral nutrition. Over the past decade there has been a shift to percutaneous CVC (PCVC) insertion. PCVC is somewhat uniquely associated with serious mechanical complications (e.g. inadvertent arterial/ subclavian vein puncture). Open surgical cut-down (OSC) on the other hand has often been promoted as the safest alternative for pediatric patients. The purpose of this review is to evaluate whether OSC or PCVC is associated with less risks in a pediatric population.

Methods: Methods: A systematic review was conducted following PRISMA guidelines. In consultation with a librarian, a comprehensive search strategy was performed of Medline, Embase and Cochrane CENTRAL from 2000 to January 2019. Outcomes extracted included success rates and complication rates (arterial puncture, pneumothorax/hemothorax, thrombosis, infection, malposition, mortality, etc.).

Results: Results: The search yielded 462 unique articles, of which 51 were included in the study. The sample size totaled 9370 PCVC line insertions (landmark, US guided, blind puncture, etc), and 836 OSC line insertions. Success rates of catheter insertion did not differ between PCVC and OSC (RR: 0.07, 95% CI -0.11 to 0.25, P = 0.44, I² = 99%). Total complications odds were significantly higher in PCVC compared to OSC (OR: 1.86, 95% CI 1.15 to 3.00, P = 0.01, I² = 48%).

Conclusion: Conclusions: Our initial analysis indicates no difference in success rates between PCVC and OSC insertion methods, however odds of complications were higher from PCVC line insertions

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Predictors for spontaneous closure of umbilical hernia in children
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Purpose: Purpose: Umbilical hernias are common in infants and usually resolve without treatment. The aim of this study was to identify characteristic of patients who are more likely to have spontaneous resolution of their hernia. Additionally, we sought to describe our experiences with the management, outcomes and complications of children with umbilical hernias.

Methods: Methods: We performed a retrospective chart review of all patients referred to the division of surgery at our institution between January 1990 and April 2017.

Results: Results: We included 2621 patients presenting with umbilical hernia; 1280 (48.8%) males and 1341 (51.2%) females. Mean age at first referral was 2.9±3.0 years. 1587 (60.5%) patients underwent surgical repair at a median age of 3.6 years (IQR 2.3-5.4 years). Of those who underwent repair, 31 had experienced an incarceration, and 2 had experienced strangulation. Surgical complications consisted of infection (n=3), bleeding (n=3), hematoma (n=3); anesthesia-related complications (n=3); and other (n=3). A total of 20 patients had recurrence of hernia after surgery. For every one-millimeter increase in defect size, the odds of a spontaneous resolution of the hernia is 5% less likely, while controlling for gender, prematurity, and the presence of comorbidities (adjusted OR 0.95; 95% CI: 0.93-0.97, p <0.001). Additionally, premature babies are 80% less likely to experience a resolution of their hernia compared to non-premature babies (adjusted OR 0.20; 95% CI: 0.03,0.74, p = 0.01).

Conclusion: Conclusions: Umbilical hernia is unlikely to become strangulated or incarcerated. The odds of spontaneous resolution are lower for premature babies and negatively correlated with defect size.

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Implementing a clinical practice guideline can change surgeon practice in pediatric acute perforated appendicitis

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Purpose: Appendicitis is the most common emergency surgical disease in children and those with perforated appendicitis have a more complicated and varied course. Through a clinical practice guideline (CPG), we sought to reduce CT scans, laboratory draws and broad-spectrum antibiotic exposure without adversely affecting length of stay (LOS), hospital readmission, or repeat antibiotic administration.

Methods: After study approval from our institutional review board, electronic records were retrospectively reviewed before and after CPG implementation and data collected in a REDCap database. Results reported as mean or percent incidence, statistical analysis was done using student’s t-test, Mann-Whitney U test, or Pearson’s χ² with p<0.05 as significant.

Results: One hundred patients total, 50 after CPG implementation, were identified. There was no difference in Pediatric Appendicitis Score (9 vs. 9 p=.48), and a trend towards increased evaluation at an outside hospital (56% vs. 74% p=.059). No differences were noted in overall CT scan rates (50% vs. 40% p=.31), but we found a decreasing trend of CT’s done at our institution (30% vs. 12% p=.055). There was a reduction in post-operative lab draws (90% vs. 38% p<.00001) and patients who received piperacillin/tazobactam (66% vs 16% p<.00001). We found no increase in LOS (4.98 vs. 4.46 days p=.25), hospital readmission (10% vs. 14% p=.54) or additional antibiotic administration (2% vs 4% p=.56).

Conclusion: We conclude that a clinical practice guideline can safely change surgeon practice patterns. We will continue to educate emergency room and surgical providers to standardize medical management of this common pediatric surgical condition.

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Reduction of central line associated bloodstream infections and line occlusions in pediatric intestinal failure patients using KiteLock®, an alternate locking solution

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Purpose: We previously reported the efficacy of ethanol locks in preventing central line associated bloodstream infections (CLABSI) in pediatric intestinal failure (IF) patients, but ethanol lock is no longer an suitable option. KiteLock®, is a 4% EDTA solution with effective antimicrobial and anti-biofilm properties. Our objective was to determine the efficacy of KiteLock® in preventing CLABSI and line complications in pediatric IF patients on long-term parenteral nutrition.

Methods: Retrospective cohort study of patients managed by 2 IF centres between Apr 1, 2016 - Dec 31, 2018. Data regarding CLABSIs, line replacements and use of alteplase (per 1000 catheter days) in the 12 months before and after initiation of KiteLock® was compared using a Wilcoxon signed-rank test. Data was reported as medians with interquartile ranges and frequencies with proportions.

Results: 20 patients [median age 83 (8-232) months; 10 Males] received KiteLock®. Median duration of treatment was 365 (278-365) days. The CLABSI rate significantly decreased after KiteLock® therapy [2.7+4/1000 vs 0+0/1000 catheter days; P=0.002]. Occlusive episodes/1000 catheter days for the entire cohort was 0 (0-5.0) pre-KiteLock® and 0 (0-2.0) post-KiteLock® (P=0.018). For patients only with occlusions pre (n=9), alteplase use significantly decreased [Pre 5.5 (2.7-19.2) vs Post 2.7 (0-2.7); P=0.018].

Conclusion: Our preliminary findings suggest KiteLock® is effective in reducing CRBSI and catheter occlusions in pediatric patients with long-term central access requirements.

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Short-term international medical trips: local collaboration and its effects on complications and patient satisfaction

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Purpose: Short-term medical trips are increasing; however, it’s uncertain who manages complications afterwards. Poor outcomes, decreased patient satisfaction, and tension on the healthcare system develop when local providers, often excluded from patient care, are unable to cope with complications. A model where visiting and local surgeons operate together provides benefit to local surgeons and establishes follow-up, resulting in better care, satisfaction, and stronger infrastructure in the host country.

Methods: Two-year retrospective review of pediatric general surgery, urology, and plastics cases performed by relief organization in the developing world. Cases graded with verified classification system for complexity and complications. Phone interviews conducted with patients/families to obtain post-operative complications and satisfaction.

Results: 474 surgeries performed on pediatric patients. 60% response rate. Respondents stratified into three levels of complexity: 159 simple, 72 intermediate, and 54 complicated surgeries. Six (2.1%) higher-level complications occurred. No association between complexity of surgery and complications. 83.5% patients satisfied with outcomes and >92% happy with effort/support of relief organization and recommend to family/friends. From patients with complications, 67% of patients/families remained happy with support from local staff and recommend care to family/friends.

Conclusion: Facilitating visiting and local surgeons performing cases together increases expertise of local providers, strengthens infrastructure, and establishes follow-up. Despite complications, patients/families continued to recommend care to family/friends by the relief organization and were happy with support from local providers. We believe engaging local providers is the gold-standard for short-term trips and results in immediate gains including building capacity for a developing country’s ability to care for its own.

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The challenges of communicating with families about an urgent care paediatric surgical trial
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Purpose: Recruitment and retention to paediatric trials in urgent care surgical settings is challenging at least partly due to the need to communicate effectively with child and parent in a time-constrained environment. We aimed to characterise the communication challenges to optimise recruitment and retention.

Methods: Qualitative study embedded within a multicentre trial of non-operative treatment versus appendicectomy for acute appendicitis. Recruitment consultations (N = 58) and semi-structured interviews with health professionals (N = 35), parents (N = 34) and children and young people (N = 14) approached about the trial were audio-recorded and transcribed. Analysis was informed by thematic approaches. Ethical approval: 16SC0596.

Results: Parents wanted their children to be involved in trial discussions but had some anxieties about what their child heard. Families were concerned that a delay whilst making a decision to join the trial may jeopardise their child’s treatment. Parents tended to prefer the treatment arm that they considered would resolve their child’s symptoms most quickly. Surgeons initially found the provision of balanced information about treatment arms challenging. Children and parents were occasionally distressed or disappointed on hearing they had been randomised to their non-preferred treatment.

Conclusion: We have identified opportunities for enhancing communication about trials in paediatric urgent care surgical settings. Awareness of these challenges will allow recruiting clinicians to adjust trial conversations to optimise delivery of information. This evidence based approach may improve trial recruitment and retention, and enhance families’ experiences of trial discussions. These findings are likely relevant to all paediatric urgent care trials.

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30 years of flipping the coin - heads or tails?
R Michael Dorman, Charlene Dekonenko, Justin Sobrino, Jason Fraser, Tolulope Oyetunji, Shawn D St. Peter
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Purpose: Ingested foreign bodies are a frequent cause of emergency department visits, most of which are coins. This typically involves overnight stay and endoscopic retrieval under general anesthesia. We seek to describe our 30-year experience retrieving these with a Foley catheter under fluoroscopy.

Methods: We identified patients less than 18 years old presenting with a suspected coin lodged in the esophagus who underwent attempted fluoroscopic foreign body retrieval with a Foley catheter in the years 1988 to 2018. Generally, this was not attempted in patient with a history of esophageal operation, active respiratory illness, older than 5 years, or with a suspected prolonged coin impaction. Failure of fluoroscopic retrieval was followed by endoscopic retrieval in the operating room. Descriptive statistics were calculated.

Results: 1038 patients underwent an attempt at coin retrieval. Average age was 3.26 years and 53% were male. Mean time since ingestion was 12.6 hours. Overall success was 84%, with 74% of coins retrieved and 10% pushed into the stomach. Mean emergency department stay for successful procedures was 3.3 hours. All of the remaining coins were successfully retrieved by endoscopy. We encountered 8 minor complications and one major complication, a tracheal tear that required operative repair, after which the patient recovered fully.

Conclusion: In our three-decade experience with performing the “coin flip” procedure, we found that complications were rare (0.1%). Practitioners who choose this approach can expect a greater than 80% success rate and reasonably safe outcomes.

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Endoscopic third ventriculostomy versus vp shunt in cases of hydrocephalus in pediatric age group
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Purpose: To compare postoperative outcomes & complication of Endoscopic Third Ventriculostomy and Ventriculoperitoneal Shunt in the management of Pediatric Hydrocephalus
Methods: Prospective study was conducted at a tertiary health care teaching institute over a period of one year. 49 patients aged up to 18 years with hydrocephalus were included in the study. Moribund cases and those lost to follow up were excluded from the study. Ventriculostomy was performed by neurosurgeon. VP shunting was done by paediatric surgeon. Data collected was analysed by Student’s t-test. They were grouped in three groups viz : less than one year, one to ten years and 11 to 18 years of age. Apart from demography, type of hydrocephalus and cause of hydrocephalus, patients were analysed for immediate post-operative complications, complication of the procedure and failure of procedure in each group.
Results: 22 patients underwent ventriculostomy while 27 underwent VP shunt. There was no statistical difference in the complication rates and outcome except for immediate post op complication in less than one year group. We discuss our experiences with both these approaches to the management of these difficult cases. We discuss the pros and cons to the usage of these approaches in the management of pediatric hydrocephalus and the challenges that we faced.
Conclusion: Both are equally effective in managing Pediatric Hydrocephalus
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Single centre experience with balloon versus non-balloon gastrostomy tubes
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Purpose: To compare primary outcomes following balloon and non-balloon G-tube placement.

Methods: Retrospective chart review over a 5-year period comparing the need for emergency, radiologic or operative interventions between balloon and non-balloon G-tube devices.

Results: 148 patient charts were reviewed (46.6% female, 53.4% male). The indication for G-tube insertion was failure to thrive for the vast majority (80.4%). Average age at insertion of G-tube was 4.3 years (median 1.8, range 0 to 17.9 years). 36.5% had a balloon type G-tube and 62.8% had a non-balloon type G-tube. Patients who had a non-balloon device had on average 1.14 emergency room (ER) visits related to the G-tube being dislodged or not functioning, compared to 0.53 visits per patient with a balloon device. Of the ER visits for patients who had a non-balloon device, 26.9% were replaced in the ER, 38.5% were replaced in radiology and 34.6% required an operation for G-tube replacement. For patients who had a balloon device that became dislodged, 47.8% were replaced in the ER and 52.2% were replaced in radiology. The majority of patients who initially had a non-balloon G-tube placed, went on to require a second operation for change of device (95.7%). Patients with non-balloon devices placed initially required an average of 2.57 subsequent operations (range 0-16), compared to patients with balloon devices who required on average 0.46 operations (range 0-4).

Conclusion: Balloon-type G-tubes require less emergency room visits and operative interventions following initial placement. Senior Author: Christopher Blackmore

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Diagnosis and management of neonatal ovarian cysts-a systematic review of the literature
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Purpose: After two patients at our institution, one with a complex cyst and one with a 7.1 cm cyst, both of which resolved spontaneously, we conducted a systematic review of the literature to determine if the usual indications for intervention are too strict.

Methods: A systematic review of the literature was performed to evaluate indications for when interventions are needed and what interventions to perform on neonatal ovarian cysts. “Pediatric” and “neonatal ovarian cyst” were the search criteria used in PubMed, 737 articles were identified. Case reports and unrelated articles were excluded. After full-text review, 9 articles were included.

Results: One study found that in-utero aspiration lead to increased rates of involution and improved ovarian salvage rates. Two studies concluded that complex cysts or those more than 4-5 cm should be operated on due to risk of torsion. Three studies found that initial ultrasound observation followed by minimally invasive operative techniques were safe even in large or complex asymptomatic cysts. In one study MRI was used to differentiate which complex cysts had higher risk of complication. One study compared outcomes between laparotomy, laparoscopy, and laparoscopic assisted trans-umbilical extracorporeal ovarian cystectomy and found that the minimally invasive approaches are safer, faster, and shortened hospital stays.

In the limited studies in which large or complex cysts were initially monitored a total of 3/8 large and 10/15 complex cysts regressed spontaneously.

Conclusion: We conclude non-operative management of large and complex cysts may be safe, with close ultrasound monitoring, and minimally invasive cystectomy should be performed whenever possible.

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Where’s Waldo’s scar? A covert approach to the umbilical hernia repair
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Purpose: Incomplete closure of the umbilical fascial opening after the age of 5 requires surgical closure, conventionally via infra-umbilical incision. We piloted an innovative umbilical hernia repair via a trans-umbilical incision. We hypothesize that this technique will improve cosmetics and reduce operative time.

Methods: We completed a cross sectional comparison within the 90 umbilical hernia repairs between 2017 and 2018. The main outcomes; cosmetics assessed using post-operative photos and operative time, calculated from OR data were compared between 80 repairs using conventional approach and 10 repairs using the innovative technique with a Mann-Whitney U test.

Results: The technique: A longitudinal incision through the midline of the umbilicus. A plane at the level of the linea-alba, is defined and the hernia sac is either dissected, divided or imbricated. The edges of the defect are clearly defined and closed in a vertical direction with interrupted absorbable suture. The excess skin is removed and closed with a fine absorbable suture with a subcuticular horizontal mattress technique. Compared to the conventional method, the innovative technique was associated with a non-statistically significant 5 minute shorter operating time (24 ± 11 vs 29 ± 11 mins, p=0.13). Data for cosmetic appearance will be presented at the meeting. No major adverse events were reported.

Conclusion: The trans-umbilical approach is a safe and effective way to repair an umbilical hernia in the pediatric population that may be associated with shorter operative time and improve cosmetics.

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Examining predictors of stool continence in a dedicated bowel management clinic at a tertiary referral center
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**Purpose:** Children with complex colorectal diseases, anorectal disorders (ARM) and idiopathic constipation (IC) benefit from longitudinal care at a bowel management program (BMP). Previous studies have identified factors that predict stool continence, but data are limited. We aimed to identify demographic and patient specific predictors of continence in our population.

**Methods:** For patients with at least 5 BMP clinic visits, templated clinic notes were queried to capture patient level data between 3/1/2015 to 3/1/2019. Variables captured included: patient demographics, primary diagnosis, toilet training status, treatment regimen, and overall continence. Multivariate logistic regression was used to determine associations between different variables and continence.

**Results:** Three hundred seven patients with incontinence were seen during the study period; 35% (n=109) patients with at least 5 visits were analyzed. Patients were 42% female (n=46), 57% white (n=62), and 53% (n=57) publically insured. In this population, 86% (n=94) had started toilet training at their first visit. By the fifth visit, 54% (n=15) of patients with IC, 44% (n=12) of those with Hirschsprung disease, and 38% (n=16) with ARM achieved continence. Average age at first visit was 7 years (IQR=1-19); the average time span over which 5 visits occurred was 1.2 years (SD=0.6). Patients presenting to our clinic at an older age have significantly higher rates of continence by visit 5 (p<0.001).

**Conclusion:** Children referred at an older age to a BMP are more continent by the fifth visit when compared to their younger counterparts regardless of diagnosis. Further studies are needed to identify factors which affect these outcomes.

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The impact of South African township environments on paediatric trauma

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Purpose: Paediatric trauma-related admissions are a daily occurrence at our tertiary level hospital in Soweto. Despite this, there are no official statistics, and a dearth of information regarding this patient population. Our study objectives were to quantify the demographics, spectrum of injuries, and outcomes for paediatric trauma admissions.

Methods: After obtaining Ethics approval from the University Medical Research Committee, a 5-year retrospective review of patient files from September 2013 to August 2018 was undertaken, including all patients admitted with a diagnosis related to trauma.

Results: 5326 children were included: 49% sustained burn injuries, with mean age of 2.5 years, injured mean Total Body Surface Area of 14.3% and mortality rate of 5.7%. Scald burns accounted for 77% of injuries, followed by 9% due to flame burns, and 7% electrical burn injuries (89% of these due to contact with illegal wiring). For general trauma, road traffic accidents (53.3%) were most frequent, followed by falls (24.3%), non-accidental injuries (5.4%), and improvised household fixtures such as doors and gates falling on children (4.7%). Mortality rate was 2%, with 6-fold increase if there was an associated head-injury. Injury-type frequencies stratified by age-group with falls most common in children under 1-year old. Violent trauma including gunshot wounds, stabs, assault and animal bites accounted for 10% of injuries but carried a 4% mortality.

Conclusion: We conclude that this population experiences a high trauma burden with higher-than-expected mortality rates for burns and violence-associated injuries. This information is relevant for designing primary prevention strategies and social intervention programs for vulnerable children.

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Utility of pre-operative right upper quadrant ultrasound in sickle cell disease patients undergoing splenectomy
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Purpose: Children with sickle cell disease (SCD) have a high predisposition to the development of biliary disease. Untreated biliary disease can lead to chronic pain and high surgical morbidity. However, there is no consensus on the use of pre-operative abdominal ultrasound to evaluate for gallstones prior to undergoing elective splenectomy in SCD patients. The purpose of this study was to determine the utility of a pre-operative abdominal ultrasound prior to elective splenectomy to evaluate for biliary disease.

Methods: We performed a retrospective review (IRB H42271) of children with SCD who underwent surgical splenectomy at our institution between January 1990 and December 2017. Patient demographics, type of SCD, pre-operative abdominal ultrasound findings, cholecystectomy history, peri-operative data and gallbladder pathology findings were collected. Data were analyzed using chi-square analysis. P-value <0.05 was considered statistically significant.

Results: Over the 18-year period, 128 patients with SCD underwent surgical splenectomy. Fifty-one percent (n=65) had an abdominal ultrasound prior to the splenectomy; of which, there were abnormal gallbladder findings in 34% (22/65). Nineteen patients underwent concurrent cholecystectomy and splenectomy. In 48% (n=20), the cholecystectomy was performed 6.9 years (IQR: 3.0 – 10.4) after their splenectomy. Of the 20 children that later had a cholecystectomy, only 8 had a pre-operative ultrasound at the time of their splenectomy. Fifty percent of these children had evidence of gallstones or sludge at the time of their splenectomy (p <0.001).

Conclusion: Patients with sickle cell disease undergoing a splenectomy may benefit from a pre-operative screening abdominal ultrasound to minimize the need for future abdominal surgeries.

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Sex differences in surgically correctable congenital anomalies: a systematic review
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Purpose: While sex differences between structural anomalies have long been acknowledged, they have never been systematically studied. This study aims to compare the prevalence of several surgically correctable congenital anomalies between sexes.

Methods: Upon registration on PROSPERO (CRD42019120165), a librarian was involved to conduct a systematic review using PRISMA guidelines. The five largest relevant studies were included for each anomaly. To examine variations in the prevalence of congenital anomalies between sexes, cumulative differences and confidence intervals were calculated, and the Cochran-Mantel-Haenszel test was performed.

Results: Of 42,722 identified studies, thirty were included in our analysis. Data from 39,444 gastroschisis (GS), 11,868 esophageal atresia (EA), 10,180 Hirschsprung disease (HSCR), 9,263 congenital diaphragmatic hernia (CDH), 6,241 intestinal atresia (IA), and 787 duodenal atresia (DA) patients were analyzed. Figure 1 summarizes our findings; males had a significantly higher prevalence than females in most anomalies (GS (Prevalence ratio [male:female] 1.10; 95%CI 1.07-1.13), EA (1.22; 1.16-1.28), HSCR (2.83; 2.65-3.03), CDH (1.44; 1.36-1.53), and IA (1.20; 1.12-1.29); p<0.01). There was no difference in the prevalence of DA between sexes (0.94; 0.80-1.19; p=0.88).

Conclusion: Our study indicates that males have higher prevalence rates of most congenital anomalies. Further investigations are required to illuminate the embryology underlying this sex distribution and whether sex influences outcomes.
Figure 1: Sex differences in the prevalence of various surgically correctable congenital anomalies. CI: confidence interval, \( p < 0.05 \) considered significant.

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Trends of surgical care in pediatric nephrectomies for malignancy
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Purpose: Pediatric general surgeons (GS) and pediatric urologists (GU) perform many of the same operations. The surgical management of renal malignancies is a part of both GS and GU practice, but it is not known whether outcomes differ by specialty. Thus, we aimed to characterize the proportion of nephrectomies performed by GS and GU and examine patient outcomes by provider type.

Methods: The Pediatric Health Information System (PHIS) was used to identify patients <18 years old who underwent a partial, total, or bilateral total nephrectomy (BLN) for a malignancy from 2010-2018. Descriptive statistics and regression analyses were calculated for volume and outcomes.

Results: Over the study period, GS performed 1785 (87%) and GU performed 264 (13%) of nephrectomies. The age at operation, mortality rate, and overall nephrectomies by specialty was similar. By operation type, GU performed more bilateral nephrectomies (3.8% vs. 0.5%). When GS is the primary service, there is a significant increase in length of stay (LOS) even when adjusting for procedure type (1.2 days greater LOS, p<0.001). Though length of stay is longer for GS, the overall cost of the encounter is not increased compared to GU (p=0.43).

Conclusion: GS perform more nephrectomies than their GU counterparts. Though cost and mortality are similar by provider, future work should examine differences in LOS and more granular outcome data.
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Analgesic, anxiolytic and sedative use in critically ill medical and surgical children
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Purpose: Management of pain, anxiety, sedation and delirium in children may vary across critical care populations. The aim of this study was to characterize pharmacologic regimens among critically ill pediatric surgical and medical patients.

Methods: Mechanically ventilated children in the intensive care unit (ICU) were identified from the PHIS 2017 database and were divided into surgical and medical cohorts. Excluded were NICU admissions, underlying pulmonary or diaphragmatic conditions, ventilation prior to admission or <24 hours, ECMO, cardiac surgeries, and trauma. Results are presented as percent and median [IQR].

Results: There were 3,729 children identified from 47 hospitals. Median age was 2[0-9] years, 56% were male, and 24% had an extreme risk of mortality. The surgical cohort was older (5[1-12] vs 1[0-6] years) with lower risks of mortality (16% vs 30%, p<0.01), and lower mortality rates (2.4% vs 5.4%). Hospital length-of-stay was longer (12[7-22] vs 11[7-18]), but ICU-free days were greater (25[20-27] vs 22[17-26]); all p<0.01. Medical patients were exposed to γ2 and GABA agonists at increased rates per day over a 30-day period, while surgical patients were exposed to antipsychotic and other sedative/hypnotic medications at increased rates (Figure 1). There were no differences in narcotic administration.

Conclusion: Medical and surgical pediatric ICU populations are unique, and these differences may extend to the pharmacologic management of analgesia, sedation, anxiety, and delirium.
Figure 1. Rate of Medication Administration per Day in ICU

Antipsychotics

- Medical
- Surgical

$\alpha_2$- agonists

- Medical
- Surgical

GABA agonists

- Medical
- Surgical

Narcotics

- Medical
- Surgical

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The fragility of statistically significant findings from randomized controlled trials in pediatric appendicitis

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Purpose: Appendicitis is the most common surgical illness in pediatric patients and has been a large focus within surgical research. Randomized controlled trials (RCT), however remain limited on this topic and the robustness of available evidence is unknown. The aim of this study was to therefore to determine the fragility of results in pediatric appendicitis RCTs.

Methods: Systematic search of Embase (1980-2018) and MEDLINE (1948-2018) was conducted. Eligible studies were two-armed RCTs that included at least one statistically significant dichotomous outcome, had parallel-group allocation, and assessed pediatric patients (0-17) with a primary diagnosis of appendicitis. Studies were limited to the English language. The Fragility Index (FI) for one significant outcome per trial was calculated using a Fisher’s exact test, with statistical significance set to p<0.05.

Results: After exclusions, 6 studies were included in the final analysis. A majority (5/6, 83%) were single-center trials. Studies included a median of 103 patients (interquartile range [IQR] 0.75-4.25), with a median of 18 (IQR 4.5-41.25) events for analyzed outcomes. The primary outcome variable was included in analysis for 4(67%) studies. The median FI across studies was 3(IQR 0.75-4.25), with results ranging from 0-5. Results indicate that overall, converting 3 patients from non-events to events in a single trial arm would change the significant dichotomous outcome to insignificant.

Conclusion: The fragility of results from randomized controlled trials in pediatric appendicitis should be calculated before clinical practice is changed based on these outcomes. Investigators should consider reporting the fragility index alongside study results, as p-values alone may be misleading.
Geographic distance to pediatric surgical care in Canada

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Purpose: Geographic proximity of children in the United States to pediatric surgeons has been described using the 2010 Census and the American Pediatric Surgical Association member file. Similar methodology has not been used to evaluate distance to pediatric surgical care in Canada. This study’s aim is to describe proximity of children living in Canada to the closest pediatric surgeon.

Methods: A list was compiled of active pediatric surgeons in Canada. The 2011 Canadian Census was used to calculate straight-line distances between pediatric surgeons’ postal code centroids and dissemination block centroids.

Results: Seventy-four practicing pediatric surgeons were identified, 493,345 dissemination blocks were identified, and 7,785,480 children were estimated. The median (IQR) kilometers to closest pediatric surgeon was 29.56 (11.46, 90.22) kilometers, and 23.66% of Canadian children appeared to have lived more than 100 kilometers from care. Ten percent of children lived greater than 250 kilometers from the closest pediatric surgeon.

Conclusion: More than 1.8 million Canadian children lived greater than 100 kilometers from the closest pediatric surgeon in 2011. This is compared to over 10 million children (13%) who lived greater than 100 kilometers from pediatric surgical care in 2010 within the United States. This method is feasible to describe distance-to-care within the Canadian health care system and may benefit future allocation of pediatric surgeons.
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Emergency surgical access in children: a prospective analysis to achieve improvements in outcome
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Purpose: Delays to emergent surgery may result in morbidity and mortality. A retrospective study at our institution showed >40% of Class 1 patients (<1 hour) were delayed and delay associated with adverse outcomes. Prospective analysis with ongoing reporting to stakeholders was undertaken in an attempt to improve access and outcomes.

Methods: Prospective, IRB approved, analysis of all emergency surgery patients (05/2018-03/2018) was undertaken. Targets were 60 minutes, 6 hours, 24 hours and 72 hours for Class 1, 2A, 2B and 3 respectively. Reasons for delay were sought. High risk criteria: ASA?3 &/or meeting SNAPP II or PRISM criteria. Morbidity was defined as loss of limb/organ or function related to the surgery. Weekly RN and quarterly physician lead updates provided. Descriptive statistics used.

Results: Of 1101 cases, 78.4%, 87.8%, 91.4% and 98.9% of Class 1, 2A, 2B and 3 achieved targets respectively. The most common reason for delay was no available OR team. Patients at high risk for death experienced delay to OR 15.5% of the time (vs.9.9% Low Risk). Six delayed patients experienced morbidity.

Conclusion: Delays to OR for Class 1 and High Risk patients remain an issue, despite the initiative. Resource realignment to ensure optimal access and care for our sickest patients seems crucial.

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Towards standardizing congenital diaphragmatic hernia (CDH) care in Canada: assessing barriers to implementing national clinical practice guidelines

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Purpose: With the recent publication of the Canadian Congenital Diaphragmatic Hernia (CDH) Collaborative clinical practice guidelines, we sought to identify implementation barriers and opportunities to increase their utilization.

Methods: With REB approval (MUHC#2019-4753), a validated, readiness assessment was sent to all CAPSNet site coordinators via SurveyMonkeyTM who then distributed it to their local CDH stakeholders. The survey was open from 11/2018-02/2019 with reminder emails. Data and responses were analyzed using descriptive statistics.

Results: Eighty-six survey responses were received of which 65% (n=56/86) were fully completed. The greatest number of responses came from neonatology (n=27/86;31%), pediatric surgery (n=25/86;29%) and respiratory therapy (n=10/86;12%). Seventy-eight percent (n=67/86) of respondents were aware of the CDH guidelines; 63% (n=54/86) used the entire guideline while 23% (n=20/86) used only certain sections. Besides recommendations pertaining to locally, non-existent services (fetal intervention, ECLS), establishing interdisciplinary long-term surveillance and prenatal diagnosis with maternal-fetal medicine coordination were seen as most difficult to implement due to funding limitations. However, most respondents (n=49/56;87.5%) felt they could implement >75% of the recommendations. Strategies to increase uptake included the establishment of common team goals [i.e. minimize daily care variations] (n=33/58;57%), provider buy-in [commitment of all health professionals to guidelines] (n=28/58;48%), and regular compliance assessment (n=23/58;40%).

Conclusion: This survey identified significant national awareness of the CDH guidelines. Focused implementation strategies that ensure common team goals, provider buy-in, and regular compliance assessment will likely increase guideline uptake and utilization. Consolidating local funding for long-term surveillance processes and coordinated prenatal diagnosis is likely necessary as part of any site-specific implementation strategy.

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The THYroid Nodules in Kids Study (ThyNK Study) an external audit of the American Thyroid Association (ATA) pediatric thyroid guidelines

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Purpose: To evaluate the management of thyroid nodules at a tertiary care pediatric centre and assess adherence to the 2015 American Thyroid Association (ATA) guidelines for children with thyroid nodules.

Methods: Records of pediatric patients presenting to a tertiary care pediatric centre with a thyroid nodule from 2007 to 2017 were retrospectively analyzed. Demographic and disease specific information were collected; clinical practice variation from the ATA guidelines and warrants for variations were explored.

Results: Of 86 patient records reviewed, 47 (55%) were managed operatively (mean age 17, 59F:27M). 15 patients (17%) had malignant pathology, 11/15, (73%) were papillary carcinoma. Of the 47 operative patients; 7 (15%) didn’t have a preoperative ultrasound [85% adherence], 12 patients (26 %) didn’t have a cytology [74% adherence]. All patients with low TSH had scintigraphy appropriately performed [100% adherence] and 2 patients (2/25, 8%) with high/normal TSH didn’t have a preoperative FNA obtained [92% adherence]. All differentiated thyroid cancers were appropriately managed with hemithyroidectomy or total thyroidectomy based on pathology (16/47) [100% adherence].

Where 100% adherence was not achieved, deviations from the guidelines were associated with complex presentation, surgeon’s decision to proceed to surgery directly and/or rare pathologies: teratoma, benign parathyroid cyst, papillary thyroid cancer in a thyroglossal cyst, recurrent neck abscesses and recurrent local disease.

Conclusion: The ATA guidelines provide a valuable framework for the management of pediatric thyroid nodules, but this study indicates both its limitations in the context of the heterogeneity and the complexity of pediatric thyroid disease and the need for more study.
First national survey on opioids prescribing practices of Canadian pediatric surgeons
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Purpose: Opioid misuse is a public health concern globally. Little is known about the national surgical prescription patterns for Canadian children. We wanted to evaluate the opioid prescribing practices of Canadian pediatric surgeons.

Methods: Following ethical approval (#100060327), an electronic questionnaire was administered to all practicing Canadian pediatric surgeons. Questions included practice information (province, years in service, hospital type, surgical cases load), patterns of discharge opioid prescription per surgery type, type of opioid prescribed, training/awareness for pain medication for surgeons/families.

Results: Fifty-eight questionnaires were completed (response rate: 84%) by surgeons from all provinces with pediatric surgery coverage (69% in free-standing children’s hospitals and 83% in centers with >1000 surgical cases/year). 72% have been practicing for >10 years. The most commonly prescribed discharge opioid is morphine. Figure 1 shows the distribution of discharge opioids prescription. 83% declared that their institution did not provide formal pain control and opioid prescribing training. Similarly, 57% denied discharge opioid education for families. 96% reported availability of a pain service.

Conclusion: This first Canadian survey on opioids prescribing practices reveals that one third of Pediatric Surgeons discharge patients on opioid for day surgeries and two thirds for major surgeries. There is a lack of education for surgeons and families about opioid use.

Figure 1 Opioid prescribing pattern for pediatric surgeons in Canada
Operative management of urachal remnants: a NSQIP based study of post-operative complications

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Purpose: Identification of urachal remnants is common in infancy with increasing evidence that non-operative management is effective in most cases. Operative management has been associated with complications in up to 20% of patients. We sought to determine if age affected the complication rate after urachal resection.

Methods: We identified patients undergoing urachal remnant resection in Pediatric NSQIP from 2013 to 2017. Exclusion criteria included emergent operations, contaminated wounds, and cases with additional procedures. The age of patients with and without any complication, reoperation, and readmission were compared by Wilcoxon rank sum. The correlation between age and stay after operation was assessed with Spearman correlation coefficients.

Results: A total of 476 patients were identified. The incidence of any post-operative complication was 16 (3.3%) with 12 surgical site infections, the average stay after operation 0.5±2.2 days, 6 (1.3%) had a reoperation, and 11 (2.3%) were readmitted. Assessing associations between outcomes and age, the median age for patients requiring reoperation was lower (0.1 years) than those not (1.3 years; p = 0.004); the median age of those readmitted was lower (0.4 years) than those not (1.4 years, p = 0.03); and there was a weak trend of younger patients having longer stay after operation (r = -0.16, p = 0.0007).

Conclusion: Operative management of younger patients resulted in greater risk of reoperation, readmission, and longer stay after operation. With the evidence demonstrating that non-operative management is effective, it may be of benefit to delay operative resection of urachal remnants to after 1 year of age.

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Enhanced recovery after surgery (ERAS®) guideline for neonatal intestinal resection surgery: an international knowledge synthesis and consensus generation approach

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Purpose: ERAS® guidelines have improved outcomes across adult surgical specialties. There are few pediatric ERAS® guidelines, none of which have focused on neonates. We have developed a new approach to ERAS® guideline creation for neonatal surgery based on GRADE methodology.

Methods: An international team defined the scope, population, and guideline topics using a Delphi approach. Systematic reviews were supplemented by targeted searching. Evidence-supported recommendations were proposed by expert subgroups. Recommendations and evidence tables were reviewed by the guideline committee who revised and rated necessity for inclusion. Revised recommendations were again reviewed during a consensus meeting and voted on for inclusion. Final recommendations were assessed for data quality and recommendation strength.

Results: Neonates undergoing intestinal resection surgery were established as the target population. 14 topics, and 18 subtopics, were identified and reviewed by 7 expert subgroups. Systematic literature searches identified 2992 titles and abstracts. Final recommendations were iteratively developed and ranged from communication strategies, to parental roles, feeding regimens and antibiotic use. Topics with poor-quality and conflicting evidence were eliminated (e.g., skin preparation). Some topics were combined (e.g., pain strategies). The quality of supporting evidence was variable. 26 final recommendations were included.

Conclusion: We conclude that the GRADE guideline creation process can be adapted to generate novel, ERAS® guidelines. This first neonatal ERAS® guideline has the potential to bridge the gap between evidence and current practice. We anticipate that this guideline, and its implementation, can improve care across a variety of neonatal
surgical specialties. Our process provides a foundation for future ERAS® guideline development.
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Implementing an early feeding pathway post-gastrostomy insertion reduces inpatient stay

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**Purpose:** There is no consensus regarding post-operative feeding strategy following gastrostomy insertion in children. The aim of this study was to determine whether implementing an early post-operative feeding pathway reduces length of stay (LOS) without increasing complications.

**Methods:** Retrospective, institutionally-approved casenote review of children having a new gastrostomy inserted during a one year period prior to (July 2016 - July 2017) and following (July 2017-July 2018) pathway introduction was performed. Children kept in hospital for other medical reasons or had a medical or nutritional reasons not to follow the pathway were excluded. LOS and post-operative complications were recorded and compared using appropriate statistics. The pathway comprised feeding 50% of normal feed at 2 hours post-procedure, followed by 100% of normal feed at 5 and 8 hours. Previously patients were fed post-operatively according to surgeon’s preference.

**Results:** Of the 185 gastrostomy insertions, 116 cases met inclusion criteria; 55 prior to and 61 after pathway implementation. Demographics were similar between both groups (Table). Children following the early feeding pathway had a shorter post-operative LOS than the historical group (median 28 vs 33 hours, p<0.003) whilst immediate (<72 hours) and early (<30 day) complication rates were similar (8.2 vs 7.3%, p=1.00 and 12 vs 16%, p=0.59 respectively).

**Conclusion:** We conclude that early post-operative feeding after gastrostomy insertion is safe and reduces LOS.

<table>
<thead>
<tr>
<th></th>
<th>Pre-pathway (n=55)</th>
<th>Post-pathway (n=61)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>4.3 (0.6-17.4)</td>
<td>2.4 (0.6-15.6)</td>
<td>0.21</td>
</tr>
<tr>
<td><strong>Weight (kg)</strong></td>
<td>14.7 (4.0-52.0)</td>
<td>11.2 (5.0-27.0)</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Male, n (%)</strong></td>
<td>28 (51)</td>
<td>41 (67)</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>Neurodisability, n(%)</strong></td>
<td>45 (82)</td>
<td>48 (79)</td>
<td>0.82</td>
</tr>
<tr>
<td><strong>Post op length of stay (hours)</strong></td>
<td>33 (22-174)</td>
<td>28 (20-126)</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Complication/re-</strong></td>
<td>4 (7.3)</td>
<td>5 (8.2)</td>
<td>1.00</td>
</tr>
<tr>
<td>admission within 72 hours, n(%)</td>
<td></td>
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<tr>
<td>Complication/re-admission within 30 days, n(%)</td>
<td>9 (16)</td>
<td>7 (12)</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Data are median (range) or number of cases; *Mann-Whitney or Fishers exact test

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